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STEEL

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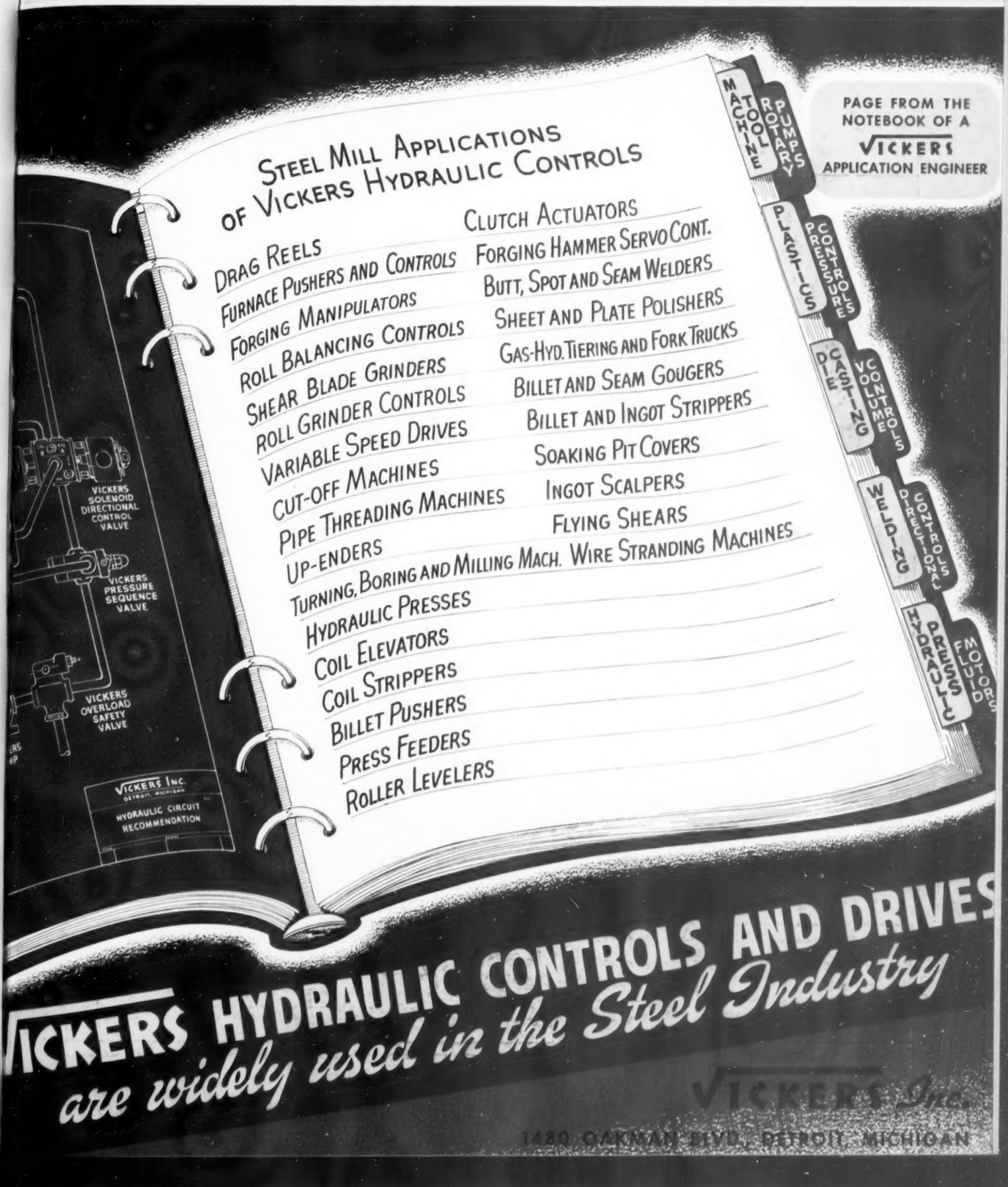
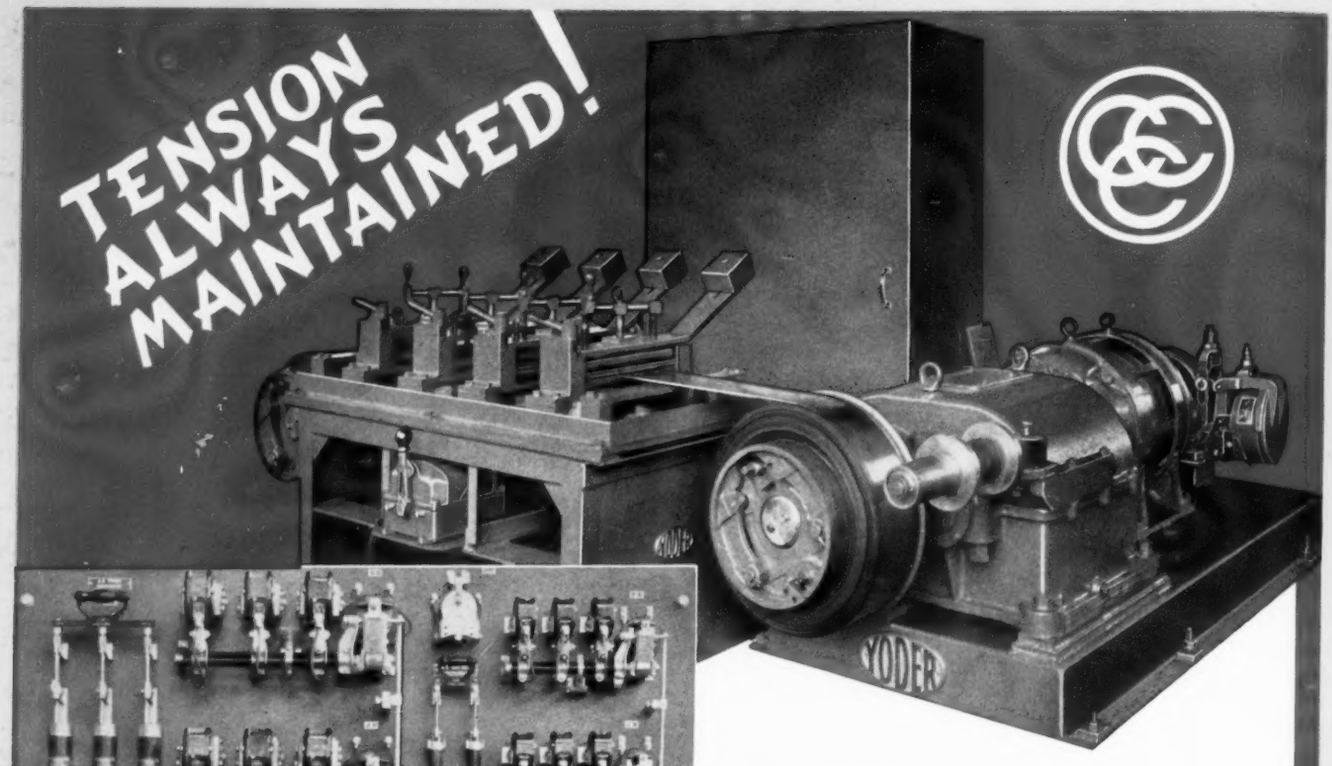
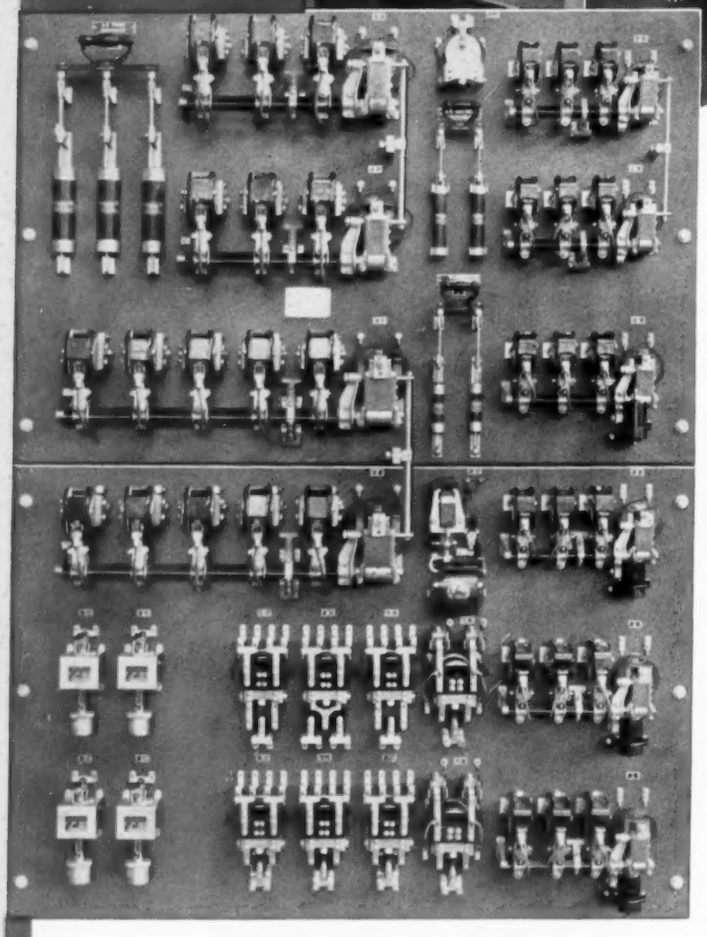
FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW







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Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Debt Ends in Insolvency

To the Editor:

I am in accord with the views expounded in the editorial in the March 28 issue of STEEL, under the caption, "Reduction Must Be Followed by Balancing of Budget."

Taxes imposed without end can be likened, in results, to a corporation assessing stockholders continually upon their equity; we both know the answer.

Expanding tax burdens, federal or otherwise, tend towards national as well as individual insolvency. Tax monies are never wisely spent for the reason that they really are never earned by the spending agency. They simply deplete the individual or collective budget for progress, technically and socially.

A reasonable debt may act as a spur for greater effort and consequent reward, but a debt that is constantly expanding, with no consequent increase in assets, means individual bankruptcy.

As you say: "The longer the task is postponed, the more difficult it will be."

L. G. PRITZ

President,
Ohio Ferro-Alloys Corp.,
Canton, O.

Balance by Spending Less

To the Editor:

I note with interest your editorial in STEEL of March 28. While I am in agreement on this entire subject, at the same time I believe too much emphasis is being placed on "balancing the budget."

I believe more emphasis should be placed on reducing expenses, thereby balancing the budget. It is a fact that the administration in Washington has been making an effort to balance the budget. However, their efforts to accomplish has been by increasing taxation. Therefore, the first step should be decreasing expenses and thereby automatically secure a balance of the budget.

L. E. KINN

President,
Seneca Wire & Mfg. Co.,
Fostoria, O.

Motordom Well Reflected

To the Editor:

We want to compliment you on your articles on the automotive industry, as given under Mirrors of Motordom, in the publication, STEEL. Whoever gets the information together for you seems to have very good sources . . . From our viewpoint this is the most valuable section of your publication.

SETH B. ATWOOD

Atwood Vacuum Machine Co.,
Detroit.

Must Cut Down Spending

To the Editor:

I have read with much interest your editorial in regard to the tax imposition (STEEL, March 28) and agree with you 100 per cent as to your deductions.

The problem doesn't seem to me so much one of transferring one form of taxation to another, as it is to get to the essential cause and eliminate as much as possible of the spending which makes necessary these high taxes.

W. T. READ

President and Treasurer,
Morse Twist Drill & Machine Co.,
New Bedford, Mass.

Industry Presses Forward

To the Editor:

I was interested in STEEL's presentation, April 11, on the position of the tin plate industry and the stability it shows because of its base on food and other household factors. This has resulted from continued research by the tin plate industry.

In various instances this has resulted in tin plate containers replacing glass and other materials, to the profit of the metal and the loss of the glass. In the present competitive situation there is constant struggle between various branches of industry to spread more widely and increase the field. There is a constant give and take as the struggle goes on.

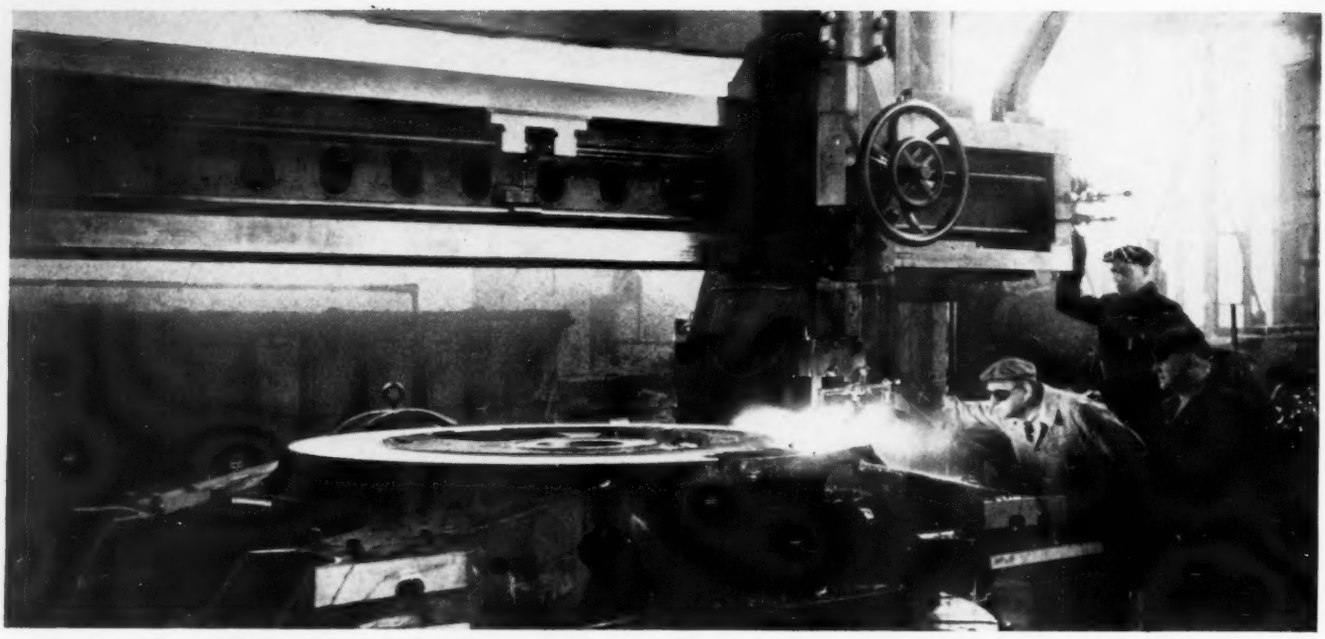
The recent rise of plastics has caused their use in place of some products formerly of metal. This is true in the automotive field as well as in others. Plastics have some qualities making them more available than the metal parts they have displaced

Use of welding instead of riveting has benefited the makers of welding equipment and supplies at the expense of the maker of riveters and rivets. Welded assemblies have cut into the market for castings. Some nonferrous metals have been substituted for steel in situations where corrosion has been a factor and the steelmaker has come back to the attack with steels that also resist corrosion.

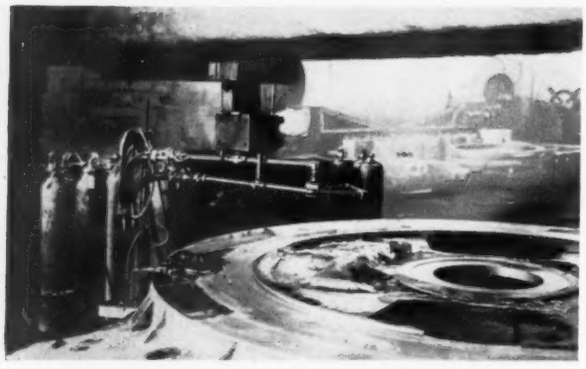
This factor is a challenge to alertness. That industry is fully alive to this situation is evidenced by the money spent in constant inquiry through research in every direction. The net result for mankind in general is a better world to live in and a higher standard of living for all.

INQUIRER

Chicago.



AIRCO FLAME HARDENING EQUIPMENT



Close-up shows how the AIRCO flame hardening torch with heating and quenching tips was mounted in the vertical tool slide. In the top illustration you see the job in process.

●

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produces the hardness effect of furnace heat treatment, with little or no distortion. AIRCO has developed the process and equipment to the point where degree of hardness, and depth of penetration can be readily controlled and accurately duplicated. The FLAME HARDENING BULLETIN gives details. Write for your copy—today.

scores again!

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The first job involved an expensive six-ton steel casting for a crane car body. The part to be hardened was the circular top surface which served as a track—an area 6″ wide with an outside diameter of 84″.

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●

OXYACETYLENE FLAME HARDENING may be the answer to your hardening problems, particularly if warpage is causing trouble. It may also enable you to cut your hardening costs. AIRCO will gladly give you full information about the process and cooperate in applying it to your specific needs.

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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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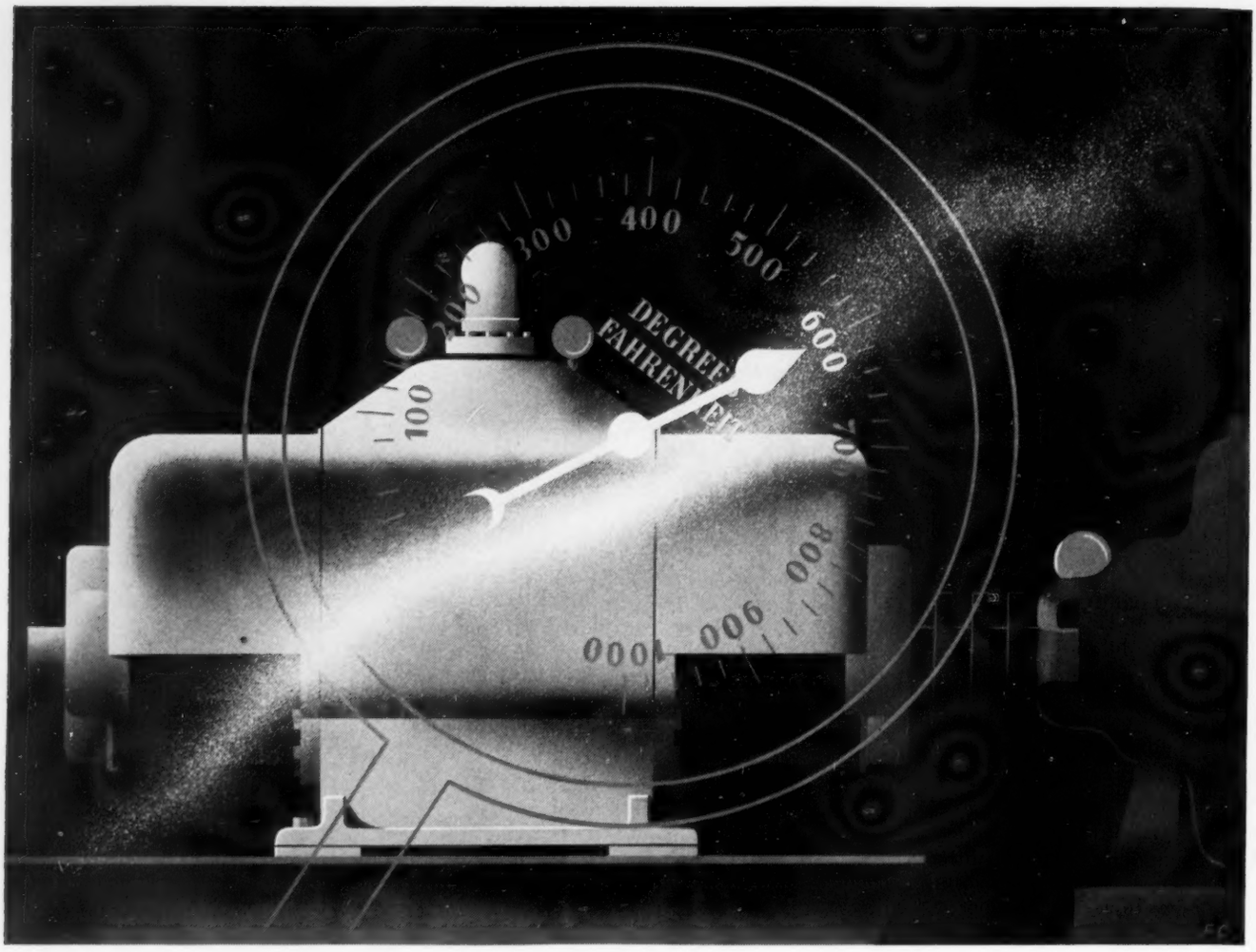

BETTER MATERIALS FOR HIGHER TEMPERATURES

NEW developments bring new problems. The designing of an improved direct-drive steam engine, for oil-field service, necessitated the use of a material that would withstand continuous subjection to high steam temperature (550° to 600°F.).

The manufacturer adopted a Chrome-Nickel-Moly (0.50—1.00% Mo) iron for vital engine parts. Due to its Moly and Chromium contents, its low growth resistance assures maintenance of the close tolerances necessary to efficient engine performance.

This iron also has advantages from the standpoint of production costs. The castings are free from defects. They have fine grain in the heavy sections and satisfactory machinability in the light sections.

On the foregoing points alone, Moly irons warrant careful consideration. And there are many others, likewise attested in practice. Our book, ***"Molybdenum in Cast Iron,"*** will show the way to more economical high-strength castings. It is free. Climax Molybdenum Co., 500 Fifth Ave., New York.

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MOLY

As the Editor Views the News

■ WITH bright skies and balmy breezes heralding the approach of summer, observers in the steel industry believe the first half peak has been reached. Production last week moved up ½-point to 32½ per cent of ingot capacity; it still is 2½ points under the 35 per cent rate registered three weeks ago. Volume of steel buying (p. 83) shows no signs of gaining and hopes for improvement now are focused on late summer or early fall. . . . Reports covering first quarter operations (p. 23) show losses by most steel companies during that period. . . . Dues drives by the UAW at Detroit and Flint brought a drop (p. 29) in automobile production. . . . A favorable development of the week was an order (p. 23) for 436 prefabricated steel houses.

• • •

Ask To See Contracts

Recently Bethlehem Steel Co. attorneys requested permission of Trial Examiner Frank Bloom, in the NLRB hearings at Johnstown, Pa., to subpoena David J. McDonald, SWOC official, for questioning as to details of SWOC agreements with United States Steel Corp. subsidiaries (p. 22). Saying SWOC wanted a similar agreement with Bethlehem, the Bethlehem attorneys contended they were entitled to know the details of these agreements. Examiner Bloom refused the request. Bethlehem has appealed to the labor board at Washington to set aside the examiner's ruling. . . . With its employes Bethlehem fared much better. More than 93 per cent of eligible workers voted in the recent elections, thereby committing themselves overwhelmingly in favor of the existing employe representation plan.

• • •

Useful at Forty

Impressions that industrial workers lose efficiency after age 40 are refuted by records of Westinghouse Electric & Mfg. Co., which reports (p. 22) that 6355 of its employes have been with the company 20 years or more. In reporting to employes the company adds, "When we go to work in the morning, what we earn the first hour and a quarter goes to pay taxes". . . Not only is the inland waterway system important to the steel industry for transportation but its barge requirements are large. One builder last year (p. 17) launched 95 vessels, second largest ship tonnage for all marine constructors, including deep sea shipbuilders. . . Selling and other commercial problems will be discussed at a special session (p. 18) at the American Iron and Steel institute's meeting on May 26, in New York.

• • •

Prolonging Roof Life

Up to the present time there has been no standardization of refractory roof design. Although no single ratio of rise to span can be adopted for all roofs (p. 42) it has been found that a relatively small number of ratios can be made to serve in practically all cases. Observance of a number of simple arch construction rules leads to long roof life. . . . The new 56-inch continuous mill at Sparrows Point, Md., has annual estimated capacity (p. 38) of 600,000 gross tons of hot strip, sheet and plate. Delivery speed from the last finishing stand ranges from 1038 to 2100 feet per minute. . . . More attention is being paid to elimination of industrial noises. New apparatus (p. 50) makes it easy to locate the sources and causes of noise.

• • •

Discuss Yearly Wage

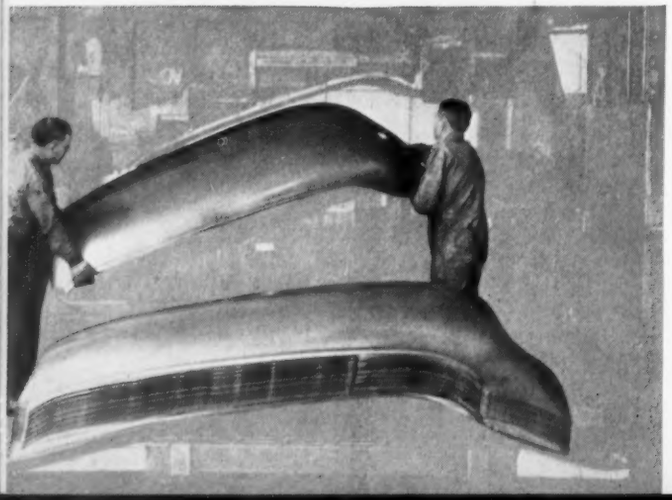
Replacement of hourly wage by annual wage plans was discussed (p. 55) at last week's annual meeting of the American Management association. Such plans are feasible, it was declared, if carefully planned with all factors in mind. . . . By installing a new mold handling system a foundry (p. 57) saves 12½ per cent in operating costs while handling 44 per cent more tonnage daily. . . . A new material (p. 64) has been developed for removing carbonate from plating solutions. It permits continuous disposal of carbonate as it is formed. . . . More economical welding practice results (p. 66) when adequate study is given to jigs and fixtures. . . . In grinding machines equipped with V-belt drives (p. 70) vibrations and load shocks are not transmitted to the wheel, resulting in superior grinding.

E. L. Shaner

They Cut Costs with INLAND Cold Rolled Sheets

Leading automobile manufacturers and body makers are among Inland's biggest customers for Cold Rolled Sheets. Their experience in analyzing production costs credits Inland sheets with four outstanding sources of savings: (1) Inland is conveniently located. (2) Mills and management are concentrated at one place for prompt action. (3) Inland has specialized in high quality cold rolled sheets and acquired a thorough and useful backlog of experience as a pioneer operator of the continuous wide strip mill. (4) Inland is always progressive, cooperative and practical.

Apply these four advantages to your own requirements for workable sheets of proper finish. Our personal interest in serving you will make them highly worth while.



INLAND STEEL CO.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES
STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

10,000 Tons of Steel Now in Typical River Tow; and More Steel Barges

PITTSBURGH

■ INTERDEPENDENCE of steel and inland waterway transportation has become more closely woven since completion of the Ohio river canalization project in 1929.

Not only is more steel required for barge and towboat construction and dock facility expansion, but an increasing amount of steel products and raw materials is being transported by water to and from the steel mills.

In ton-miles iron and steel rank second only to coal in volume. This is largely due to the number of long hauls of finished steel products to downriver ports.

Although depression years have delayed full realization of benefits, developments of the past two years have indicated the part steel will play in further progress in river transportation.

In 1928, iron and steel products shipped on the Ohio river in the Pittsburgh district were 12 per cent of the total tonnage of all products carried by water. In 1929, this was 11 per cent; in 1930, 12 per cent; in 1931, 10 per cent; in 1932, 9 per cent; in 1933, 7 per cent; in 1934, 8 per cent; in 1935, 8 per cent; in 1936, 9 per cent; in 1937, 10 per cent. In 1936-37, however, total water shipments were nearly 4,500,000 tons greater than in 1928-29.

Until after the World war towboats ordinarily were of wood construction. Many of these still are in use. Of nearly 700 towboats listed by the United States army engineer corps, approximately 450 are wood and 250 steel.

Barge Builders Active

In contrast, 2182 steel barges are listed, while only 909 wood barges remain, and many of the latter are used only for local service.

Newer uses for barges are being developed. A recent example is the conversion of a standard 900-ton coal barge into a motor car carrier. Three steel tiers were installed to enable loading of 81 automobiles. Two such carriers have been completed for service between Evansville, Ind., and Mississippi river points.

Barge builders have been active during the past two years. One builder last year launched 95 vessels, the second largest ship tonnage of all marine constructors, including deep sea shipbuilders.

Use of barges for crude oil and refined petroleum products transportation has increased sharply during the past decade. Tendency has, of course, been toward use of all steel equipment. Some barges recently completed carry up to 8600 barrels of oil, and in many cases are equipped with their own pumping facilities, allowing unloading at practically any point.

Varied Products Shipped

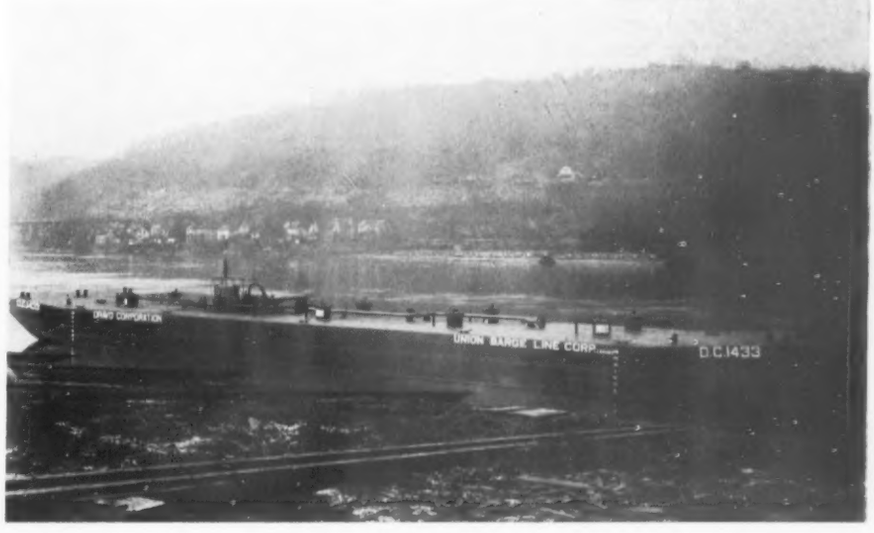
Actual shipment of steel products has reached the point where several trips weekly are made to points as far south as Houston, Tex., by way of the intracoastal canal. A typical tow consists of a towboat and about ten barges, which carry 10,000 tons of steel products.

Heaviest tonnage is pipe and tubing for the southwestern oil fields, although a substantial tonnage of structural steel also is shipped. Barbed wire fencing for western and southern farms and ranches, as well as manufacturers' wire, nails, and spikes, are shipped in box barges, as are steel bars, plates, shapes, reinforcing bars, cold-finished steel bars and other products for southern warehouses.

Bulk of iron and steel river traffic originates in the Pittsburgh district, to and from plants located along the banks of the Monongahela, Ohio, and Allegheny rivers. The traffic is carried largely by private lines, generally operated by steel companies. Coal, most active commodity, is moved in large quantities from mines to steel mills. Coal shipments over the Monongahela river alone between Fairmont, W. Va., and Pittsburgh, a distance of 127 miles, amounted to 21,707,933 short tons in 1937, an average of 1,808,994 tons per month.

Carnegie Steel Co. inaugurated river transportation service in 1917 for the movement of coal and coke to its various plants. In that year the company had one towboat and 21 steel barges. Today Carnegie-Illinois has 18 towboats, 363 open steel barges, 26 covered cargo barges, and 2 acid-transporting barges.

Jones & Laughlin Steel Corp. was the leader in long distance river transportation of steel products,



■ River shipments of petroleum products have increased sharply in the past ten years with a consequent increase in demand for steel barges. Pictured is a new all-welded steel oil barge, manufactured by Dravo Corp., Pittsburgh. Capacity is 8600 barrels. Dravo recently has built eight of these barges

starting as an experiment in 1921 by sending a steel-laden tow to the west and southwest. The venture proved successful and today a regularly organized distribution system carries J. & L. products to the west, southwest, and south.

Carnegie Steel Co.'s first tow went down river in 1922. Today, several companies, including Wheeling Steel Corp., Pittsburgh Steel Co., and others, regularly use the rivers to move products from mills to consumers, and carry raw materials to plants.

Total shipments on the Ohio river from Pittsburgh to Cairo, Ill., rose rapidly following completion of the 9-foot stage in 1929. In 1924, total shipments were 10,866,682 tons. This had reached 21,955,148 tons by 1929 and 22,337,434 tons by 1930. The bottom of the depression, 1932, saw 14,316,914 tons shipped, rising with business recovery to a new high of 24,383,689 tons in 1936. The U. S. army engineers' office estimates 1937 figures will be within a few thousand tons of 1936.

Shipments Reflect Recession

Iron and steel products shipped over the Ohio river in the Pittsburgh district were 1,236,906 tons in 1930, dropped to 418,990 tons in 1932, and reached a new high of 1,305,870 tons in 1937.

In the Pittsburgh district where shipments are largely coal and steel products recent tonnage figures reflect the recession. From 2,401,923 tons in August of 1937, tonnages shipped on the Monongahela dropped 2,297,643 in September, 1,954,068 in October, 1,483,374 in November, 1,239,497 in December, 1,165,525 in January, 1938, and 1,040,277 in February. March, however, showed an increase of 185,590 tons, totaling 1,225,867 tons.

Iron and steel products shipped during the same period showed a similar decline, dropping from a peak of 128,200 tons in July, 1937, to 48,862 in February, and recovering to 57,060 in March, highest since November.

On the Ohio river in the Pittsburgh district, total tonnages shipped were as follows: August, 1937, 1,210,107; September, 1,119,970; October, 1,055,596; November, 886,195; December, 706,674; January, 635,885; February, 686,378; March, 787,505. The rise in tonnage for February was due largely to an increase in coal tonnage hauled, while practically all products jumped upward in March. Iron and steel shipments over the Ohio river totaled 163,705 tons in July; 133,650 in August; 122,600 in September; 89,750 in October, 70,600 in November; 67,875 in December; 73,250 in January; 74,612 in February, and rose to 91,550 in March.

Broaden Steel Meeting Program

■ AMERICAN Iron and Steel institute has added a commercial session to the program for its forty-seventh general meeting, May 26, Waldorf-Astoria, New York. Selling and other commercial problems will be discussed at this session in the afternoon.

The program also includes the usual morning session, an informal luncheon, a technical session in the afternoon, and a banquet. Attendance at all sessions will be restricted to institute members.

T. M. Girdler, chairman, Republic Steel Corp., and president of the institute, will preside at the morning session and deliver the opening address. Other speakers will be William A. Irvin, vice-chairman, United States Steel Corp., and E. T. Weir, chairman, National Steel Corp., both of whom are vice presidents of the institute.

Walter E. Watson, vice president, Youngstown Sheet & Tube Co., will be chairman of the commercial session, at which three addresses will be given. R. E. Zimmerman, vice president, United States Steel Corp., will discuss "Coupling Sales to Research"; W. B. Gillies, vice president, Youngstown Sheet & Tube Co., will speak on "Promoting Demand Through Improving Quality"; and N. J. Clark, vice president, Republic Steel, will discuss "The Problem of the Small Order." Four papers will be read at the technical session, at which Wilfred Sykes, assistant to the president of Inland Steel Co., will serve as chairman. Authors and subjects:

J. T. Whiting, vice president, Alan Wood Steel Co., "Microscopic and Petrographic Studies of Blast Furnace Materials."

H. W. Johnson, superintendent of blast furnace department, Inland Steel, "The Peripheral Distribution of Gases in the Blast Furnace."

H. W. Graham, general metallurgist, and H. K. Work, director of research, both of Jones & Laughlin Steel Corp., "Effects of Variation in Pig Iron on Quality of Steel."

Richard S. McCaffery, professor of mining and metallurgy, University of Wisconsin, "A Study of Blast Furnace Slags."

Taylor Plans Study of Management Problems

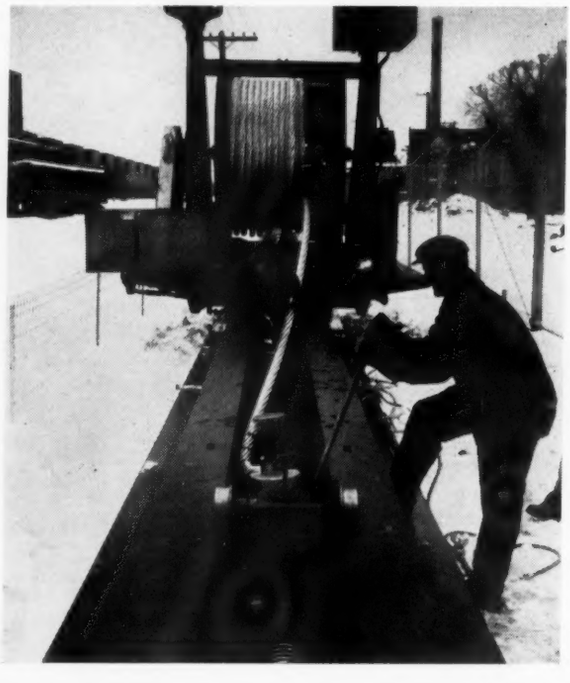
■ Myron C. Taylor, retired chairman, United States Steel Corp., plans to devote considerable time to study and development of theories on industrial relations and other management problems. While it has been suggested he may conduct this work on behalf of a leading research institution, it is now said he prefers to undertake the study on his own initiative.

Mr. Taylor will sail April 30 for a vacation of several months at his summer home in Florence, Italy.

■ Lincoln Electric Co., Cleveland, has established a subsidiary, Lincoln Electric Co. (Australia) Pty. Ltd., at Sydney, for manufacturing arc welding equipment.

Stretch Suspension Bridge Cables

■ **This is the snowy goodbye that April in Williamsport, Pa., gave a set of cables for a suspension bridge over the Rio Magdelena in tropical Colombia. The eight cables are 2⅝ inches in diameter, 860 feet long, and are prestressed to a maximum load of 183,000 pounds with this machine at the Williamsport plant of Bethlehem Steel Co. where they were made. Bethlehem also fabricated the steel for the bridge**



Open Hearth and Blast Furnace Men Seek Better Operating Practice

■ VOLUNTARY discussion of open hearth and blast furnace problems developed a wealth of information at the second annual joint conference of the Open Hearth and Blast Furnace and Raw Materials committees of the American Institute of Mining and Metallurgical Engineers at Hotel Statler, Buffalo, April 20-22. Total registration was approximately 420, with 350 convening with the open hearth group and 70 with the blast furnace group.

Announcement was made that the 1939 joint conference will be held in Cleveland, with April 26-29 as the tentative dates. Four new members of the Open Hearth committee were named as follows: W. C. Kitto, open hearth superintendent, Pittsburgh Steel Co., Pittsburgh; J. W. Kinnear Jr., assistant general superintendent in charge of operations, Carnegie-Illinois Steel Corp., Munhall, Pa.; M. J. Devaney, superintendent of steel production, Carnegie-Illinois Steel Corp., South Works, South Chicago, Ill.; and Gilbert Solar, manager of research, Steel & Tube division, Timken Roller Bearing Co., Canton, O.

Addressing a joint luncheon of the two committees, W. A. James, chief engineer, Lackawanna division, Bethlehem Steel Co., spoke on the "Development of the Iron and Steel Industry on the Niagara Frontier." He asserted that in 1873 this area produced 40 per cent of all rolled iron beams used in bridge and building construction in this country.

Simultaneous sessions were held by both groups Wednesday and Friday and a joint session Thursday morning. On Thursday afternoon an inspection trip was made through the blast furnace plant, wide-flange structural mill, No. 3 open-hearth shop and continuous strip mill of Bethlehem Steel Co., Lackawanna, N. Y.

Economy in Slag Breaking

Discussing carbon dioxide bombs for breaking up slag in open-hearth slag pockets at the opening session of the open hearth committee, one operator stressed the main advantage as a saving of furnace production time. He mentioned a gross saving of 40 per cent in labor hours, or a gross of $145 per furnace. For this amount he deducted $100 for the cost of the shot leaving a net saving of $45 per furnace. On another furnace a saving in rebuilding time ranged from 16 to 24 hours. ,

Provision must be made against flying material, the speaker stated, and a slight loss in brickwork can be expected in shattering slag by this means. When demand for tonnage exists, the use of Cardox CO_2 bombs offers the advantage of speeding up repair work.

No danger is involved in placing a bomb in a hot hole for the heat does not cause enough pressure to affect the CO_2 on the interior. The speaker recommended that a stream of water be turned into the hole to provide a hydraulic effect in the shooting operation.

Setting Off the Bombs

In making the bombs an extra heavy pipe is needed. This is threaded at each end. In the so-called nozzle on one end is inserted a steel disk which lets go at different pressures. On the opposite end is a cap with an electrical connection and a cartridge heating element. A perchlorate generates the heat which gasifies the CO_2 and builds up a pressure sufficient to dislodge the steel disk in the nozzle.

No difficulty is encountered in drilling the hole although water is being directed into pit during the drilling operation. A pneumatic hammer equipped with a sinker drill is used. Three holes are drilled per slag pocket, the job per hole requiring from 1 to 2 hours.

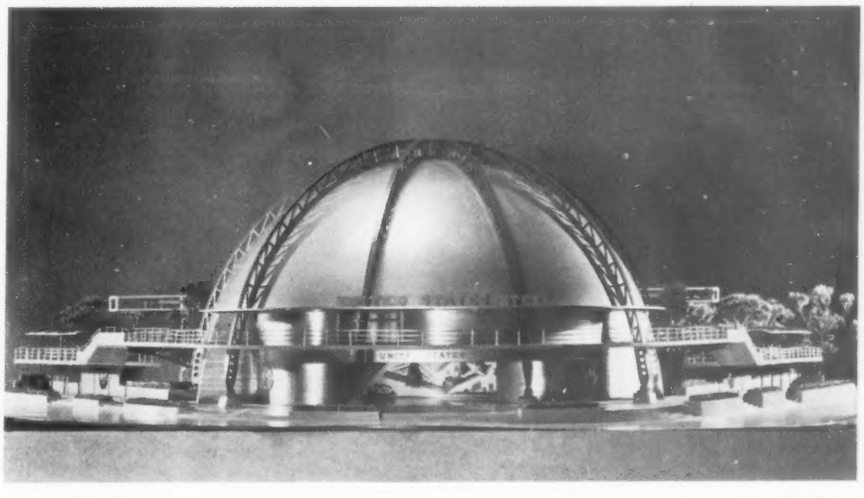
At one shop a miniature crane of the electrically-operated plug-in type is employed for hoisting wheelbarrows of slag to floor level, from 30 to 50 being handled per hour.

Many open hearth shops in this country use Washington magnesite for making bottom repairs. One shop in the Pittsburgh district in comparing Austrian and American grades found no difference. On account of the Austrian grade being shipped from various mines, the material frequently was of nonuniform analysis. At another shop the speed for installing a Canadian magnesite bottom was at the rate of 922 pounds per hour, compared with 726 pounds for the American grade. Estimated saving of installed 57,165 pounds of Canadian magnesite amounted to $157.70 in labor and fuel. Last month this furnace averaged 13 minutes per heat for bottom delays.

Discussion brought out the composition of seawater magnesite. The mother liquor remaining after salt is extracted from salt water is mixed with lime. Various additions then are made in order to make a properly balanced magnesite including lime and silica. The mix then is burned in a rotary kiln to clinker form. At present one plant is producing 25,000 tons annualljy. The cost is the same as regular magnesite. Four plants on the Pacific coast use this material regularly.

Use of Olivine in close contact with silica brick or with common cements is not recommended. Where

U. S. Steel Plans "Inside Out" Structure



■ **United States Steel Corp.'s exhibit at New York World's fair will be housed in a hemisphere-shaped building of polished stainless steel, supported by external structural members. An architectural innovation, the "inside out" design will make the exterior as much a part of the exhibit as the interior. The dome measures 66 feet high, 132 feet in diameter and will require 28,000 square feet of stainless steel. Photo shows model**

chrome is used as a mortar, a glossy surface is obtained. A majority of the applicatioins of Olivine is in backwalls although its use now is spreading to runners and topholes. When used in runners, the joints are made with lumnite. Experiments at present are being made with water glass and fine chrome ore as the mortar and every indication points to better results.

Figures were cited by a ladle manufacturer to show that the trend of steelworks ladles in this country is toward welded construction. At present, he stated, there are 21 open hearth shops with 180 welded ladles with a total holding capacity of 22,000 tons. In 1932, two welded ladles were used in this country with a combined capacity of 170 tons. In 1936 the total number of welded ladles had increased to 120 with a total capacity of 13,335 tons. Welded ladles on order or in use in this country at present have a total capacity of 22,020 tons. A slide was shown of a 165-ton welded ladle with a test load of 307.9 tons.

Approximately 90 carbometers are in service at various open hearth shops in this country for making preliminary carbon determination of heats. At one plant where three units are used the practice of checking the carbometer analysis with result from the control laboratory still is maintained. Opinion among open-hearth operators is that this instrument is not accurate for carbon determination below 0.10 per cent. One producer depends on this unit entirely for preliminary carbon analysis between the range of 0.15 to 0.85 per cent.

An instrument used by the Germans to determine steel temperatures before tapping was described by a metallurgist. The thermocouple is made of a tungsten-molybdenum wire which has a higher melting point than steel and dissolves rather slowly. The couple is inserted in a protecting tube made of silicon carbide. Because the two alloys oxidize in air, the wire is made sufficiently thick so that after the oxygen in the protecting tube is used up the nitrogen serves as a protector from then on. For temperatures above 1200 degrees Fahr., the electromotive force is steady. The speaker announced that the unit looked promising although still is in the experimental stage.

Rectangular Ingots Edge Rolled

Rectangular-shaped ingots afford little difficulty in the matter of rejections if they are edge rolled in the bloomer to give a better slab, stated a representative of an ingot mold manufacturer. At an Ohio plant 80 per cent of the steel is cast in molds 22 x 54 inches and to go to wider molds would result in surface difficulty, according to the superintendent.

Considerable discussion deiveloped over the use of Lunkerit. This material is an exothermic powder used for the reduction and control of the formation of piping as well as in steel castings. It is widely used in European steelworks. When placed on liquid steel, it ignites and increases the heat of the top portion of the ingot and keeps it liquid for a considerable length of time, thus avoiding the formation of piping. An important advantage is that molten metal can be added on top of the Lunkerit layer without danger of the material being carried into the ingot. The material does not affect the physical and analytic properties of the steel nor cause carburization, inclusions or segregation. Smaller heads can be used and larger ingots poured without the use of a hot top.

A few open-hearth operators in this country who now are using this material were highly complimentary in their remarks concerning the use of this powder. Lunkerit is imported at present and costs 8 cents per pound. Present practice calls for the use of 1 pound of the powder per 1000 pounds of steel treated.

Mold wash procedure brought out an interesting fact concerning the use of tar. At one plant the molds are dipped in water, the boiling action assisting in the cleansing action. When at a temperature of 350 degrees Fahr., they are sprayed with heavy tar which dries to a glossy surface. The molds are teemed at a temperature between 100 and 150 degrees Fahr. Tar is obtained from the company's coke ovens. Recently when cracks and seams developed in the steel, investigation disclosed that the tar being used for the wash was lighter than usual because of the coke plant coking at a lower temperature. Changing to a heavier tar for the wash immediately caused a sharp reduction in faulty steel.

More Tar As Mold Wash

From a questionnaire recently sent to various shops by the Open Hearth committee requesting mold wash data, it develops that eight shops use graphite, ten use tar, three use salt and one uses oil as a mold wash.

One plant tried heavy oil as a mold wash but because of an increase in the amount of scabby steel the shop went back to the use of tar at a material reduction in defective steel.

In discussing tap hole maintenance one operator cited the use of No. 695 refractory as affording the tapping of 60 to 75 heats before replacement was necessary. Charging starts after the hole is patched whereas his former practice with chrome ore involved 2 hours for building up the hole.

At another plant the tap hole is made of chrome ore, magnesite

(*Please turn to Page* 104)

Steel To Perpetuate Art

■ **Artists find certain advantages in a new galvanized sheet with special paint-gripping surface for oil paintings. The sheets, unlike fabric, are moisture-proof; they do not set up harmful chemical reactions, and their slight expansion and contraction will not crack hard paints. Well waxed, pictures may be preserved indefinitely. Above, Herbert W. Fall, Ohio artist, is examining a painting on one of the new sheets, made by American Rolling Mill Co., Middletown, O.**

Unite To Develop New Alloy Steels

■ FREDERICK D. FOOTE and Dr. Beram D. Saklatwalla have organized Alloys Development Corp. of New York, with offices in the International building, Rockefeller Center, 630 Fifth avenue, New York, as successor to United States Rustless Steel & Iron Corp.

The company will specialize in development and promotion of low-cost weight-saving steels and serve as consultant to the metallurgical and chemical fields. It will promote industrial and structural uses of new materials.

Mr. Foote, who is president of the new company, resigned from the United States Steel Corp., where he has been interested in developing these steels, notably for the railroad field.

Frederick D. Foote

Dr. Saklatwalla is well known for his work in chromium-copper steels, in reducing vanadium ores and his activities with the Vanadium Corp. of America. His work in chromium-copper steels was recognized when he was awarded the Grasselli medal in 1924, the third time, only, this award has been made by the Society of Chemical Industry.

Dr. Beram D. Saklatwalla

Mr. Foote began his career with Greenville Steel Car Co., Greenville, Pa., subsequently becoming president. The Greenville company was made a subsidiary of Pittsburgh Forgings Co. in 1930 and soon afterward he became head of the combination. In 1933 he resigned to join the United States Steel Corp.

Patents on several low-chromium copper alloys are held by the Alloys Development Corp. in many steel producing countries.

Among directors of the new company are Edwin Hodge Jr., president, Pittsburgh Forgings Co., and Carl W. Ehni, vice president, Peoples-Pittsburgh Trust Co., Pittsburgh.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended April 23	Change	Same week 1937	Same week 1936
Pittsburgh	29	— 1	95	63
Chicago	30.5	+ 0.5	84.5	70.5
Eastern Pa.	28	None	59.5	44
Youngstown	31	None	86	79
Wheeling	44	+13	96	92
Cleveland	30.8	+ 7.8	79.5	79.5
Buffalo	30	+ 2	93	70
Birmingham	66	None	80	69
New England	25	— 5	100	75
Cincinnati	45	+27	86	84
St. Louis	36.3	— 6.1	82	†
Detroit	18	None	95	100
Average	32.5	+ 0.5	91.5	69.5

†Not reported.

67 Per Cent Machine Tools Over 10 Years Old

■ Machine tool purchases in the past two years have made only a slight dent in accumulated obsolescence, a survey by Warner & Swasey Co., Cleveland, indicates. The survey is based on replies to a questionnaire received from 251 industrial concerns, having an estimated 9 per cent of all machine tools in use.

Analysis of the replies shows: More machine tools were purchased in past two years for expansion than for replacement; smaller companies forged ahead more rapidly than larger companies in machine tool buying; total buying, for both expansion and replacement, has been at an average rate of only 4.8 per cent a year.

Of new machine tools purchased in the last two years, only 40.2 per cent were listed as representing actual replacement of old machines.

PRODUCTION

■ A GAIN of one-half point in the national operating rate last week carried it to 32.5 per cent. Changes at various centers were minor and indicated no definite trend.

Youngstown, O.—Continued at 31 per cent with probability of 30 per cent this week. Present activity includes 31 open hearths and two bessemers in operation. Active blast furnaces number eight.

Birmingham, Ala.—Steady at 66 per cent for the fifth consecutive week.

St. Louis—Loss of one open hearth brought a decline of 6.1 points to 36.3 per cent.

New England—Down 5 points to 25 per cent, one open hearth being taken off. A slight gain is expected this week.

Cincinnati—Increased 27 points to 45 per cent, the high rate being scheduled on alternate weeks.

Detroit—Unchanged at 18 per cent. Ford Motor Co. has been operating its 10 and 14-inch bar mills and this week plans to resume on its 12-inch sheet mill.

Central eastern seaboard—No change from 28 per cent, with indications for the same rate this week.

Chicago—An advance of half a point to 30.5 per cent followed the decline of the previous two weeks.

Wheeling—Resumption at several down-river plants increased the operating rate 13 points to 44 per cent.

Pittsburgh—Slight revisions have caused a drop of 1 point to 29 per cent. Standard Tin Plate Co., Canonsburg, Pa., subsidiary of Continental Can Co., is operating only on alternate weeks, because of large inventories and limited storage space.

Cleveland—Up 7.8 points to 30.8 per cent on resumption of three open hearths by Republic Steel Corp.

Buffalo—Addition of one open hearth each by two leading producers increased production 2 points, to 30 per cent.

Auto Production Drops

■ Automobile production for the week ended April 23 totaled 60,563 cars, 1458 less units than the previous week's total of 62,021, according to *Ward's Reports*. Comparisons:

	Week ended April 23	Week ended April 16
General Motors	23,370	23,620
Chrysler	13,550	13,775
Ford	16,085	16,135
All others	7,558	8,491

Monthly and yearly comparisons will be found on page 30.

LABOR

PRESENTS ANNUAL REVIEW OF INDUSTRIAL RELATIONS

■ REVERSING a current impression that the effective life of an industrial worker lags after he reaches 40, Westinghouse Electric & Mfg. Co. reports that 6355 of its employes have been with the company 20 years or more.

In its "Annual Review of Industrial Relations" the company reveals that eight of these men have been employed by Westinghouse at least 50 years, and 121 of them have been employed for 45 years.

Other classifications included in the report list 148 forty-year men, 844 thirty-five-year men, 1159 thirty-year men, 1614 twenty-five-year men, and 2432 twenty-year men.

These figures were based upon the year 1937, at the end of which 51,151 persons were employed, with an average age of 36 years and an average length of service of nine and one-half years.

Similar emphasis upon service and experience is placed in the report upon the company's 17 officers. The average age of these men is 53 years, with an average of 25 years with the company.

The company's tax bill for 1937 was $14,046,475 in direct taxes, equal to $113 every working minute of the year. These taxes compared with $2,511,486 in 1934; $4,987,193 in 1935; $8,946,753 in 1936. The report states:

"If we add to the direct taxes paid by the company a fair estimate of the direct taxes paid by the employe from his income, and to that add the hidden taxes he pays, all of which are paid for by toil, we have a fair estimate of $34,500,000, or 15 per cent of our production.

"When we go to work in the morning, what we earn the first hour and a quarter goes to pay taxes."

BETHLEHEM WORKERS IGNORE CIO; VOTE FOR ERP

Despite CIO's best efforts to boycott employe representation plan elections in Bethlehem Steel Co. plants, more than 93 per cent of eligible workers voted in the March balloting.

Of 53,325 eligible employes, 49,805 participated, according to information received from chairman of the representatives in the company's principal plants.

By voting, these workmen approved the employe representation plan as a method of collective bargaining. Printed on each ballot was this message from the representatives' election committee:

"By using this ballot the voter approves the holding of the nominations and election as stated in the posted notice of this election issued by the employes' committee on rules under the plan of employe representation at this plant, and expresses the desire to be represented for collective bargaining purposes and the other purposes stated in the notice by employe representatives elected under the plan."

Results of the elections:

Plant	Voted	Eligible	Per Cent
Sparrows Point, Md.	16,269	17,260	94.3
Lackawanna, N. Y.	6,750	6,755	99.6
Bethlehem, Pa. ...	7,336	7,769	94.4
Johnstown, Pa.	6,559	7,557	86.8
Fore River, Mass. ..	3,959	3,399	85.9

A determined drive was made by CIO organizers to persuade Bethlehem workers to stay away from the polls.

BETHLEHEM APPEALS TO SEE SWOC CONTRACTS

Bethlehem Steel Co.'s request to examine the text of SWOC agreements with United States Steel Corp. subsidiaries was refused last week by Trial Examiner Frank Bloom in NLRB hearings at Johnstown, Pa.

Bethlehem immediately appealed to the labor board in Washington to set aside Examiner Bloom's ruling.

Alfred McCormack, Bethlehem counsel, argued he knew of no better way to throw light on the question of the employe representation plan as a collective bargaining agency than by looking at other bargaining agreements. Subpoenas for this material and permission to call David J. McDonald, SWOC secretary and treasurer, were refused, and Mr. McCormack's supporting argument was not admitted to the record.

The SWOC-Carnegie-Illinois agreement has a particular bearing on the Bethlehem case, Mr. McCormack insisted, because the union seeks a similar agreement with Bethlehem.

"We do not know what all these United States Steel Corp. agreements provide . . . but we want to find out; and we think we are entitled to find out.

"I call your attention to the fact that, in the Republic Steel Co. case, the board characterized the signing of the contracts which we seek to have produced as 'an event of historic importance in the steel industry,' and quoted an official of SWOC as referring to the Carnegie-Illinois agreement as the 'standard collective bargaining contract' of SWOC. The official so quoted was the very one who signed the charge in this case.

"We cannot see how the record in this case can be complete if the basis of collective bargaining which was supposedly offered to respondent by the complainant is excluded."

PRESIDENT REPORTS TO JOBHOLDERS IN PERSON

Employes of Manning, Maxwell & Moore Inc., Bridgeport, Conn., recently heard a detailed report on last year's operations delivered personally by the president, Robert R. Wason.

Before more than 1000 jobholders convened in a Bridgeport auditorium, Mr. Wason interpreted all

179 Years with Westinghouse

■ These five men have a combined employment service of 179 years with the Westinghouse Electric & Mfg. Co.'s lighting division, Cleveland. They are typical of the 6355 employes who have been with the company 20 years or more. Service records of those in the group range from 31 to 41 years

phases of the company's business, explained what happened to the sales dollar, illustrated his report with 60 lantern slides. Employes were invited to ask questions which were answered by the president.

Employes learned: 84 per cent of the company's 1937 income came from products developed since 1932; 45 per cent of the Bridgeport plant employes are more than 40 years old; 44 per cent have worked for the company more than five years.

Mr. Wason expressed the opinion the general business outlook is not as dark as sometimes painted, averred "what business needs today is a chance to settle down and go to work."

WAGE-HOUR BILL REPORTED OUT BY HOUSE COMMITTEE

The house labor committee last week reported out a new wage-hour bill providing for a minimum wage of 25 cents an hour and a maximum work week of 44 hours, to be gradually increased to 40 cents an hour and reduced to 40 hours a week.

Holds Lower Wage Rates Must Precede Recovery

■ Readjustments in wage and price relationships, headed first by a lowering of wage rates, must occur before sound prosperity can prevail, Dr. Harold G. Moulton, president, Brookings institution, declared in a talk before the Chicago Federated Advertising club last week.

Pointing out that rates of pay were advanced late in 1936 and early in 1937 at a much faster rate than prices, Dr. Moulton maintained substantial reductions in wages must take place if prices are to be lowered and production thereby revived. He looks for no lasting benefit resulting from the government's proposed spending program but expects it to give some stimulus to the expansion in business he anticipates will develop this fall. If this upturn is to be made lasting, however, a successful attack on fundamental problems will be necessary, he added.

Books Order for 436 Prefabricated Houses

■ The largest individual order booked by Harnischfeger Corp., Milwaukee, since it engaged in prefabricated house construction is one received recently from John H. McClatchy, Philadelphia real estate operator, for 436 houses, valued at approximately $500,000.

The order increases to more than 600 the number of such houses sold by the Milwaukee firm. Its steel house division in West Allis, Wis., has been placed on double shifts to meet production schedules.

FINANCIAL

VERITY AT MEETING ON FIFTIETH ANNIVERSARY

■ GEORGE M. VERITY, chairman, American Rolling Mill Co., Middletown, O., observed his 50th anniversary in business last Thursday, April 21, the date of the annual stockholders' meeting. For him is claimed a longer record of continuous service as chief executive of a major steel company than any other man now living, 38 years as president and chairman of the American Rolling Mill Co.

Among the half century's developments in iron and steel, Mr. Verity recalled to stockholders Armco's contributions in special grades of sheets and the development of the continuous rolling mill.

"Although some uninformed persons may contend otherwise, the continuous process has actually increased employment in the iron and steel industry, and provided new jobs for thousands."

The management reported first quarter operating profit of $701,568. This represents a cash gain of $195,307, after deducting preferred dividend requirements of $506,261. Depreciation and depletion reserve amounted to $898,878, making a reduction in surplus of $703,571.

•

Republic Steel Corp., Cleveland, reports a consolidated net loss of $3,062,564 for the first quarter after deducting all charges. This compares with a net profit of $5,567,063 in the quarter last year.

•

Sharon Steel Corp., Sharon, Pa., reports net loss of $151,090 for the first quarter after taxes, depreciation and interest, but exclusive of the company's share of losses in subsidiaries. This compares with a net profit of $475,778 in the first quarter last year.

•

Keystone Steel & Wire Co., Peoria, Ill., reports first quarter net profit of $187,569, equal to 25 cents a share. This compares with $378,154 or 50 cents a share in the same quarter last year, and $32,226, or 4 cents a share, in the December quarter.

•

Continental Can Co. Inc., New York, declared the second quarterly interim dividend of 50 cents a share on its common stock, payable May 14 to holders of record April 23.

•

Otis Steel Co.'s shareholders last week amended the company's articles of incorporation to eliminate the prior preference stock hertofore outstanding, all of which has now been retired. President E. J. Kulas reported net loss of $297,378.95 for the quarter after a depreciation charge of $270,000, compared with a profit of $702,396.26 in the same period last year. Directors declared the usual quarterly dividend on convertible first preferred stock, payable June 15 to record June 1.

Pollock Co. To Build Blast Furnace in India

■ William B. Pollock & Co., Youngstown, O., has been awarded a contract by Tata Iron & Steel Co., Jamshedpur, India, for a 1000-ton blast furnace. Steel will be furnished by Carnegie-Illinois Steel Corp., Pittsburgh.

This furnace is part of an extension program by the Tata company, which also included several mills. Steel capacity is planned to reach 1,250,000 tons annually. Details of this expansion were given in STEEL, March 29, 1937. H. A. Brassert & Co., Chicago and London, are consulting engineers in charge.

American Can Officials Inspect Tin Plate Mill

■ Benjamin Fairless, president, United States Steel Corp., Henry W. Phelps, chairman, American Can Co., and other officials of both companies last week inspected the new tin plate mill of Tennessee Coal, Iron & Railroad Co., U. S. Steel subsidiary at Birmingham, Ala.

While their visit caused some speculation over possibility of a can-manufacturing plant in the South, American Can Co. headquarters in New York denied such a plant was contemplated, averred the visit was only an inspection trip.

1937 Rail Production Highest Since 1930

■ Rail production last year totaled 1,445,739 gross tons, largest annual total since 1930 when 1,873,233 tons were produced, according to the American Iron and Steel institute.

Last year's output, however, was only a little over half the annual average of 2,711,081 from 1922 to 1929. In 1936, 1,219,846 tons were produced; 1935 production was 711,537 tons.

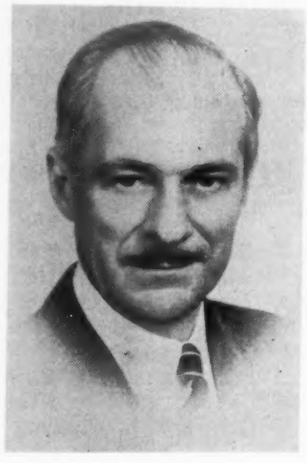
Of last year's total, 1,400,832 tons were rolled from ingots. On the basis of production by weight per yard, the largest item was rails weighing 100 and less than 120 pounds. This weight included 727,929 tons, all open hearth. Pennsylvania was the largest producer with output last year of 393,150 tons.

MEN OF INDUSTRY

■ HENRY G. DALTON, senior partner in Pickands, Mather & Co., Cleveland, and chairman of the board, Youngstown Sheet & Tube Co., Youngstown, O., has been awarded the Cleveland medal for public service by the Cleveland chamber of commerce, "in recognition of the devotion of his constructive mind and his broad vision, throughout many years, to the charitable, educational and civic institutions of Cleveland."

♦

John A. Stephens, recently appointed director of industrial relations, United States Steel Corp. of Delaware, was guest of honor at a dinner tendered him by friends at the Woodmar Country club, Hammond, Ind., April 18. He formerly was Chicago district industrial relations manager for the Carnegie-Illinois Steel Corp.



John S. Andrews

♦

T. J. Digan has been elected secretary-treasurer, United States Steel Products Co., New York.

♦

Charles L. McHenry has resigned as treasurer, H. K. Porter Co., Pittsburgh, after 52 years affiliation with the company.

♦

Pell W. Foster Jr. has been elected a director, Foster Wheeler Corp., New York, to succeed Schuyler M. Meyer.

♦

C. R. Phillips, president, Automatic Products Corp., Chicago, has succeeded Vincent Bendix as chairman of the board of that company.

♦

J. A. Amos has been elected president, Pyle-National Co., Chicago, succeeding William Miller who has become chairman of the board. Mr. Amos has been vice president for the last 12 years.

♦

H. C. Hoover, formerly works manager, Ohio Steel Foundry Co., Lima, O., has been made works manager, Crawford Steel Foundry Co., Bucyrus, O.

♦

J. C. Wattleworth has become vice president in charge of manufacturing, Cleveland Automatic Machine Co., Cleveland. Heretofore he served as factory manager.

♦

H. Kirke Becker, formerly vice president and general manager, Peters Machinery Co., Chicago, has been elected president. He has been associated with the company since 1921.

♦

John S. Andrews, vice president in charge of sales, and N. D. Devlin, vice president in charge of operations, Rotary Electric Steel Co. (Michigan), Detroit, have been elected directors of the company.

♦

Harold E. Churchill, for the past 12 years affiliated with the research engineering activities of Studebaker Corp., South Bend, Ind., has been named assistant research engineer.

♦

Richard Nugent, assistant to the president, Round Oak Co., Dowagiac, Mich., maker of stoves and furnaces, has been elected president, succeeding Harry Howard, who becomes chairman of the board.

♦

James R. Dunsford, formerly of Pittsburgh, has been elected president, and a director, Wilson Foundry & Machine Co., Pontiac, Mich. He succeeds Charles E. Wilson, who continues as a director.

♦

Alfred Lushing, a member of the board of water and power commissioners at Los Angeles, has been appointed assistant general manager, Pennsylvania Iron & Steel Co., Los Angeles.

♦

Charles S. Boardman has been named consulting engineer in the specialty sales division of Carnegie-Illinois Steel Corp., Pittsburgh. He formerly was with Jones & Laughlin Steel Corp., Pitsburgh.

♦

George D. Shaeffer has become associated with Gar Wood Industries Inc., Detroit, as chief engineer of the road machinery division. Mr. Shaeffer was chief engineer for the past 11 years of the road machinery division, W. A. Riddel Corp., Bucyrus, O. He was also with Allis-Chalmers Mfg. Co.'s road machinery division for several years.

♦

Frank J. O'Brien, vice president in charge of manufacturing, and F. Gladden Searle, vice president in charge of sales, Continental Can Co. Inc., New York, have been elected directors of the company.

♦

Ben G. Kaplan, of M. S. Kaplan Co., Chicago, and David Pollock, of Mayer Pollock, Pottstown, Pa., have been appointed chairmen of the brokers' and yard dealers' committees, respectively, of the Institute of Scrap Iron and Steel Inc., New York.

♦

Dan W. Hirtle, hitherto vice president, Burgess Battery Co., Chicago, has been elected president. Dr. C. F. Burgess has been made chairman of the board. Prior to his association with Burgess, Mr. Hirtle was an assistant superintendent, American Rolling Mill Co., Middletown, O.

N. D. Devlin

♦

Walter H. Aldridge, Francis D. Bartow, Lewis H. Brown, H. Edward Manville, William R. Seigle, Enders M. Voorhees, George Whitney and E. T. Stannard, have been elected directors, Johns-Manville Corp., New York.

♦

Joseph Wilkoff, Wilkoff Co., Youngstown, O., has been appointed chairman, traffic committee, Institute of Scrap Iron and Steel Inc., New York, while Morris Schapiro, Boston Iron & Metal Co., Baltimore, has been appointed chairman of the institute's export committee.

♦

H. A. Woofter, formerly chief engineer for Federal Machine & Welder Co., Warren, O., recently has been named sales manager of Progressive Welder Co., Detroit. Prior to his association with Federal, Mr. Woofter for 11 years was vice president and chief engineer of

Swift Electric Welder Co., Detroit, and prior to that was electrical engineer for Thomson Electric Welder Co., Lynn, Mass.

♦

Emerson Frantz has been appointed general sales manager of Bohn Aluminum & Brass Corp., Detroit. Active with Bohn in production and sales capacities since the organization of the company in 1924, he was made manager of the bearing division in charge of production and engineering in 1933, a position which he has held up to his present appointment.

♦

Carl C. Gibbs, president, National Malleable & Steel Castings Co.; James L. Luke, treasurer, Cleveland Cliffs Iron Co., and George S. Case, chairman of the board, Lamson & Sessions Co., all of Cleveland, are among seven newly elected directors of the Cleveland chamber of commerce.

♦

William H. Davey, president, W. H. Davey Steel Co., Cleveland, has been elected a director, Grovesend Steel & Tin Plate Co. Ltd., Gorseinon, Glamorganshire, Wales. The Grovesend company, with three steel plants in Wales, 90 tin and 30 sheet mills, is a leading subsidiary of Richard Thomas & Co. Ltd.

♦

A. vanDerZee, hitherto vice president and general sales manager, Dodge division, Chrysler Corp., Detroit, has been named to the new position of vice president of the corporation in charge of development of sales of passenger cars and commercial vehicles. W. M. Purves, assistant general manager of sales, succeeds Mr. vanDerZee.

♦

Harry F. Boe has been appointed manager, service department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He succeeds W. K. Dunlap, assistant to vice president, formerly in charge of the department, who has retired. Mr. Boe started work at East Pittsburgh in 1900 as a coil winder. Since 1922 he has been, successively, manager of the Buffalo sales office, eastern district manager, and commercial manager, the position to which he was appointed in May, 1937. He is a member, American Institute of Electrical Engineers; Engineers' Club of New York, Electrical Association of New York.

Harry F. Boe

Emerson Frantz

♦

John W. Hubbard, of Pittsburgh, has been re-elected chairman of the board, Ralston Steel Car Co., Columbus, O. Other officers chosen are: President and general manager, Frank A. Livingston; secretary-treasurer, Leon C. Roy; purchasing agent, H. E. Grashel; works manager, C. L. Fox; production manager, W. E. Osborn.

♦

Harold J. Skidmore, heretofore assistant superintendent at the Detroit plant of Morse Chain Co., subsidiary of Borg-Warner Corp., has been named factory manager and superintendent. He succeeds C. B. Mitchell, resigned. L. D. Worden, formerly associated with the W. A. Jones Foundry & Machine Co., has been made assistant sales manager in charge of industrial products manufactured in the Detroit plant.

DIED:

■ MICHAEL J. KIST, 49, manager of sales, Lorain division of Carnegie-Illinois Steel Corp., Pittsburgh, April 18 at his Johnstown, Pa., office. Born in Johnstown, Mr. Kist began his career with the Lorain Steel Co. in June, 1903, and had been continuously employed by that company and its successor.

♦

Edward G. Williams, 57, director of purchases, Thompson Products Inc., Cleveland, April 14 in Somerset, Ky., of injuries sustained in a fall. He was associated with the company many years.

♦

Charles A. Perryman, district sales manager, American Cable division, American Chain & Cable Co. Inc., Houston, Tex., in that city, April 12.

♦

Theodore P. Conant, 81, president, Sligo Iron Store Co., distributor of iron and steel products, St. Louis, in that city, April 9. He was associated with the firm since 1877.

♦

P. D. Rees, 52, for many years associated with the fabricating industry on the Pacific coast, and secretary of Palm Iron & Bridge Works, Sacramento, Calif., in that city, April 8.

♦

John S. Baker, 68, president, Baker Mfg. Co., Evansville, Wis., and noted inventor in the field of agricultural tools and farm equipment, April 14.

♦

William Gibson, general foreman of the Gary sheet and tin mill, Carnegie-Illinois Steel Corp., in Chicago, recently.

♦

William Erwin Caldwell, 80, founder and president, W. E. Caldwell Co., Louisville, Ky., manufacturer of steel tanks and towers, in Louisville, recently.

♦

Robert Hamilton, 83, chief mining engineer for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., until his retirement in 1931, in Birmingham, April 14.

♦

Charles M. Roehm, 71, retired industrialist and banker, April 9 at his home at Lake Angelus, near Detroit. He formerly was president of Roehm & Davison, structural steel producers.

♦

J. E. Wray, manager of Allis-Chalmers Mfg. Co.'s district office at Philadelphia, in that city, April 18. A graduate in electrical engineering from Penn State college, he joined the company's Norwood works, Cincinnati, in 1910, and in 1919 was transferred to Philadelphia.

♦

Frank W. Jones, 61, president, Hanover Wire Cloth Co., Hanover, Pa., in that city, April 12. He became associated with the Hanover company in 1931, and before that was general manager of sales in Philadelphia for the former Eastern Steel Co., Pottstown, Pa. He was one of the organizers of the Steel Club of Philadelphia and had served as its secretary-treasurer, vice president, and president. More recently he served as president, Wire Cloth Manufacturers' institute.

MEETINGS

FAIRLESS TO ADDRESS CONCRETE STEEL INSTITUTE

■ BENJAMIN F. FAIRLESS, president, United States Steel Corp., Pittsburgh, will be a principal speaker at the fourteenth annual meeting of the Concrete Reinforcing Steel institute at the Homestead, Hot Springs, Va., April 28-29.

Two addresses are scheduled for the opening session: "What the Future Holds for Reinforced Concrete," by Frank T. Sheets, president, Portland Cement association, Chicago; and "Human Relations in Industry," by M. P. Grady, foreman, Pennsylvania railroad shops, Canton, O.

In the evening the forms department will attend a dinner, this to be followed by regional conferences. The second session will convene on the morning of the second day and will feature an address by Gen. Hugh S. Johnson, Washington; a roundtable discussion on "Our Industry's Problems — Suggestions for Meeting Them"; and the election of officers. The annual golf tournament will be held in the afternoon.

WAREHOUSE ASSOCIATION OUTLINES PROGRAM

Twenty-ninth convention of the American Steel Warehouse association at the Waldorf-Astoria, New York, May 3-4, will focus attention on practical warehouse problems. Among the topics for discussion are: A plan for mill-warehouse relationships; industrial marketing; labor laws and business legislation; salesmanship; and services and functions of warehouse distributors.

OHIO SECTION OF A.I.M.E. WILL MEET IN COLUMBUS

D. C. Jackling, president, American Institute of Mining and Metallurgical Engineers, will be guest of the Ohio Valley section of the organization at a meeting at Battelle Memorial institute, Columbus, O., May 6. At an afternoon session, Dr. Zay Jeffries, technical director, incandescent lamp department, General Electric Co., Cleveland, will speak on "Metallic Vitamins," and Earl C. Smith, chief metallurgist, Republic Steel Corp., Cleveland, will describe a recent trip through European steel mills.

IMPACT TEST SYMPOSIUM FOR MEETING OF A.S.T.M.

A symposium on impact testing will be one of the features of the forty-first annual meeting of the American Society for Testing Materials in Chalfonte-Haddon hall, Atlantic City, N. J., June 27-July 1. This symposium will constitute an effort to present an integrated series of papers covering basic theories underlying impact tests, factors affecting impact, and practical application of the test to metals and welds.

Among other subjects in the metals field to be considered at various sessions are: Boiler water embrittlement of steel; effect of temperature; fatigue; hardness measurements; and radiographic testing.

No exhibit of testing apparatus will be held in connection with the meeting, in line with the society's policy of conducting exhibits only at two-year intervals.

MILL SUPPLY GROUPS TO CONVENE IN PITTSBURGH

A program focused upon current governmental and industrial problems has been prepared for the triple mill supply convention at the William Penn hotel, Pittsburgh, May 8-11, with the American Supply and Machinery Manufacturers', National Supply and Machinery Distributors' and Southern Supply and Machinery Distributors' associations participating.

Separate sessions of each association and several joint sessions will be conducted. Among the latter are the opening meeting on the morning of May 9, devoted to federal legislation and taxation and distribution of mill supplies; an afternoon session on May 10 dealing with "More Profitable Distribution;" and a luncheon May 11 at which Benjamin F. Fairless, president, United States Steel Corp., will speak.

A closed session of the American association on the morning of May 10 will feature an industrial relations clinic and another on the following morning will headline a distributor relations clinic. Among speakers for the first clinic is J. H. Goss, vice president, Scovill Mfg. Co., Waterbury, Conn., with an address on "Meeting the Employe Challenge."

At the second clinic, H. F. Seymour, Columbian Vise & Mfg. Co., Cleveland, will speak on "Improved Distributor Relations as a Basis for Greater Profit and Co-operation;" and W. E. McFee, American Rolling Mill Co., Middletown, O., will discuss "The Value of Trade Paper Advertising."

COAL MEETING, EQUIPMENT EXHIBITION, MAY 2-6

Coal mine operators will hold their fifteenth annual convention in Cincinnati, May 2-6, under sponsorship of the American Mining congress.

Questions of mine safety, personnel training, responsibility of mine officials in personnel management, conveyor mining, power problems, surface preparation, mine ventilation, coal cutting and blasting, are among topics.

More than 140 manufacturers of mining machinery and equipment will be represented in the exposition in Music Hall.

OHIO A.S.M. CHAPTERS TO HEAR CORROSION PAPERS

Four technical papers and an open discussion period dealing with metal corrosion and protective coatings and a luncheon will feature the annual tri-chapter meeting of the Cincinnati, Columbus and Dayton, O., chapters of the American Society for Metals at the Engineers' club, Dayton, April 27.

Papers to be presented at a morning session are: "Planning and Interpretation of Corrosion Tests," by C. W. Borgman, National Tube Co., Pittsburgh; and "Rustless and Stainless Steel," by Dr. V. N. Krivobok, Carnegie Institute of Technology, Pittsburgh.

In the afternoon session, R. F. Passano, American Rolling Mill Co., Middletown, O., will speak on "Engineering Applications of Corrosion Test Data"; and H. J. French, International Nickel Co. Inc., New York, on "Low-Alloy, Corrosion-Resisting Steels." An open forum following will be devoted to metal plating, hot dip coatings, and paint and nonmetallic protection.

DATE FOR WESTINGHOUSE TOOL FORUM IS ADVANCED

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has advanced the date of its third annual machine tool electrification forum one day to May 9-11. Preliminary announcement of the forum was made in STEEL for April 11, page 41.

FOUNDRYMEN TO HEAR HOOK AT BUSINESS SESSION

Charles R. Hook, president and general manager, American Rolling Mill Co., Middletown, O., and president, National Association of Manufacturers, will address the annual business meeting of the American Foundrymen's association May 18 during the association's annual convention at Cleveland.

CREDIT MEN TO CONVENE IN SAN FRANCISCO JUNE 5-10

Forty-third annual credit congress, sponsored by the National Association of Credit Men, will be June 5 to 10 in the St. Francis hotel, San Francisco. H. E. Kay, credit manager, Industrial Brownhoist Corp., Bay City, Mich., again will serve as national chairman of the machinery manufacturers group. He announces a comprehensive program of discussion topics covering the industry's credit problems. Convention sessions will be open to all manufacturers and suppliers of machinery and industrial equipment, whether or not members of the National Association of Credit Men.

Activities of Steel Users, Makers

■ AUTOMATIC Machinery Mfg. Corp. has been organized to take over the business and assets of the Automatic Machine Co., Bridgeport, Conn., in accordance with a plan recently approved by federal district court in New Haven, Conn. Active personnel of the Automatic Machine Co. will continue and George L. Sexton will remain as president and general manager of the new organization.

♦

Atlas Tool Co., Detroit, has changed its name to Atlas Engineering Co. Executive personnel is unchanged.

♦

Greer Steel Co. has removed its sales office and warehouse from 4055 Beaufait avenue to 17385 Ryan road, Detroit.

♦

Sullivan Machinery Co. is moving its general offices from 307 North Michigan avenue, Chicago, to Michigan City, Ind. The sales office will remain at the Chicago address.

♦

Iron & Steel Products Inc., Chicago, has discontinued its New York sales office and for the present that territory will be handled from Chicago.

♦

Eastern Rolling Mill Co., Baltimore, has opened a district sales office in New Orleans, room 304, Carondelet building. E. H. Hall is in charge.

♦

St. Louis office of Allen-Bradley Co., manufacturer of motor control equipment, has been moved to 404 North Seventeenth street. G. W. Schalchlin is district manager.

♦

Black & Decker Mfg. Co., Towson, Md., has opened a factory service branch at 935 North Illinois street, Indianapolis. H. F. Linder is service representative and M. D. Mooers, of the sales department, will make it his headquarters.

♦

General Alloys Co., Boston, has appointed Ladd Equipment Co., Pittsburgh, as its representative covering western Pennsylvania, West Virginia, Garrett and Allegany counties in Maryland, and eastern Ohio.

♦

Hyde Park Foundry & Machine Co., Hyde Park, Pa., has booked an order from the Steel Corp. of Bengal Ltd., in British India, for four cold mills, four hot mills, four sheet squaring shears and other auxiliary steel mill equipment.

♦

Eberhard Mfg. Co., division of Eastern Malleable Iron Co., Cleveland, is going forward with its improvement program begun last year. It is expected the newly mechanized plant will be ready for operation early in the summer.

♦

A. F. Holden Co., New Haven, Conn., has appointed James H. Knapp Co., 4920 Loma Vista avenue, Los Angeles, its representative in California.

♦

Owosso Parts Corp., Owosso, Mich., has been organized to manufacture small electric motors and allied products. Headed by Ralph Redmond, the company will obtain machinery and equipment from the A. G. Redmond Co., Flint, Mich.

♦

Russell, Burdsall & Ward Bolt & Nut Co., with plants at Port Chester, N. Y., Coraopolis, Pa., and Rock Falls, Ill., has taken a license under the Phillips recessed head screw patents of the American Screw Co., Providence, R. I., and is now manufacturing a complete line of sizes.

♦

Johns-Manville Corp., New York, will build a million-dollar plant at Jarratt, Va., for manufacture of insulating board products. Construction will start soon on a 142-acre site acquired by a Virginia subsidiary. When completed late in 1938, the new plant will employ 300 to 400 persons.

♦

A four-story building, 60 x 333 feet, to cost $263,000, will be erected by Norton Co., Worcester, Mass., to replace plant No. 1, 53 years old, and the old office building. Floors are designed to carry a live load of 250 pounds per square foot. This is the second step in a renovation and replacement program in which plant No. 3 was replaced in 1937.

♦

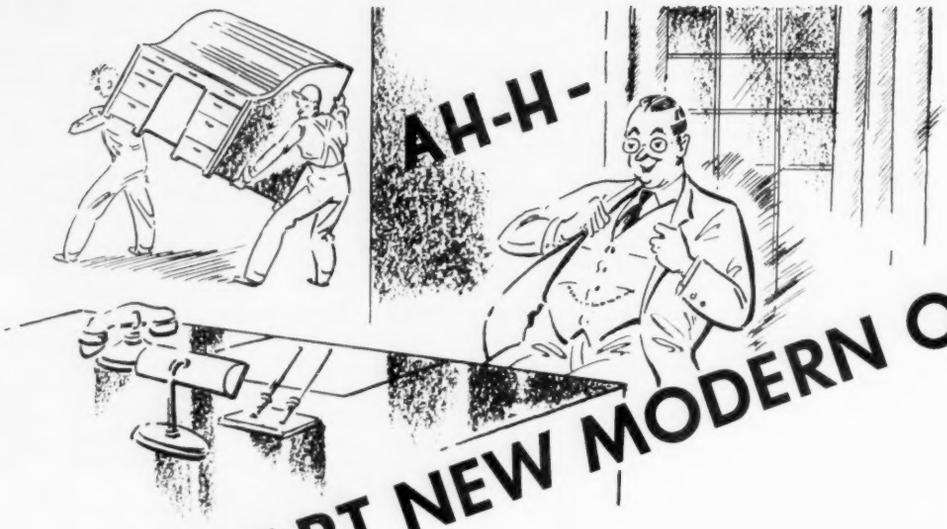
Hugo Mfg. Co., West Duluth, Minn., manufacturer of gas appliances and metal stampings, has installed equipment to make all types of tanks ranging in capacity from 60 to thousands of gallons, either black or galvanized steel. The line includes tanks for oil equipment, and septic tanks. Distribution of this product will be concentrated in northern Minnesota, northwest Wisconsin and the upper peninsula of Michigan.

♦

Nice Ball Bearing Co., Nicetown, Pa., has placed an educational exhibit in the halls of Franklin institute, Philadelphia. This includes a "magic spiral." A spiral wheel delicately balanced on ball bearings receives a steel sphere in its center, the weight of the ball causing the wheel to rotate. A novel system of gears and motors, controlled with a time switch, demonstrates the versatility of ball bearings in various mechanical uses.

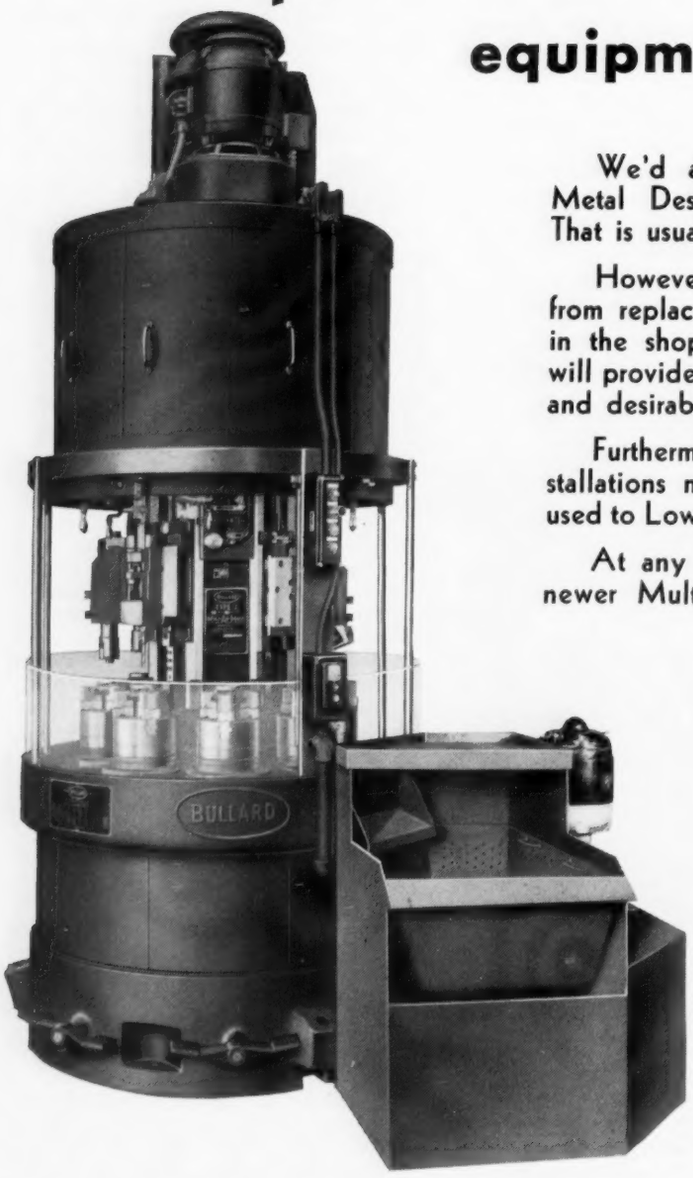
Steel Aids Stratosphere Study

■ **Dr. Jean Piccard discusses air pressure, methods of conditioning and purifying the air in airplane cabins at high altitudes with his aeronautics students at the University of Minnesota. Laboratory equipment includes an especially-built airplane cabin of Toncan sheet metal, manufactured by Republic Steel Corp. Dr. Piccard's twin brother, Auguste, also has won fame for his stratosphere studies, in 1932 ascended 54,450 feet in a balloon**



A SMART NEW MODERN OFFICE !

BUT..how about the equipment in the shop ?



We'd all like that Smart New Modern office; Metal Desks, Cabinets and what-have-you! BUT! That is usually the stumble word.

However, the Lower Costs and Profits resulting from replacement of the old manufacturing equipment in the shop with Smart New Modern machine tools will provide the means for the purchase of other needed and desirable units in your organization.

Furthermore Savings from Mult-Au-Matic installations may be distributed as additional Profits or used to Lower the Price of your Products or maybe both.

At any rate, many manufacturers replace with the newer Mult-Au-Matics because they know it pays.

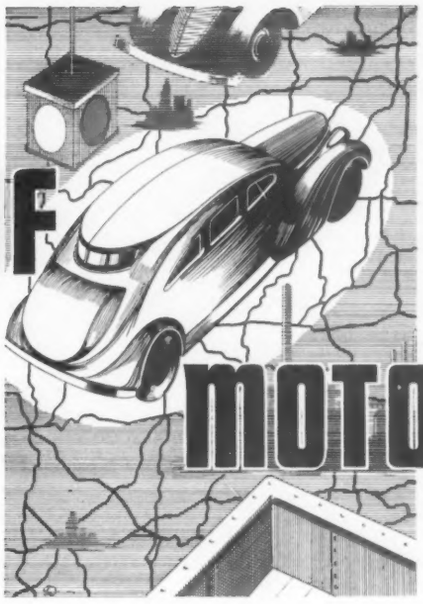
If it Profits others to use Mult-Au-Matics it can and will Profit you to do likewise.

Send us job prints or samples for time studies and Estimates. Then compare with the best previous method.

THE BULLARD COMPANY

BRIDGEPORT · CONNECTICUT

MIRRORS OF MOTORDOM



DETROIT

■ TRAGIC is the only word to describe the latest fulminations of the United Automobile Workers in plants here and at Flint—tragic for employes who desperately need every hour of work available, and tragic for management seeking to bolster a badly sagging production curve. Here is the score on last week's developments:

"Dues drives" by the UAW at Fisher No. 1 plant in Flint kept 3700 idle for three days, and an additional 1500 Buick assembly line employes were without work because of stoppage of bodies.

Mass picketing at the Fisher plant resulted in frequent rioting between union men and nonunion men and delinquent dues payers. Police were powerless. Only after a strong statement from General Motors' Knudsen, promising to keep the plant closed until picketing ceased did the UAW call off the drive and announce that it would make its "button check" as the men came from work instead of as they approached the plant.

Strike votes were taken Wednesday by UAW locals at Chevrolet and Buick in Flint in protest against placing foremen on production jobs. The management maintained demoted foremen were entitled to seniority over regular workmen, but the UAW appeared adamant in its protests.

Three plants of Bohn Aluminum & Brass Corp., employing 175, were closed early in the week because of UAW labor disputes and dues drives.

American Brass Co. was forced to close Wednesday, throwing 750 out of work, after powerhouse employes pulled switches in a protest over a 10 per cent wage cut.

Five hundred employes of Detroit Moulding Corp., subsidiary of L. A. Young Spring & Wire Co., were idle following a UAW dispute over wages.

A similar dispute at Michigan Steel Castings Co. kept 120 from working.

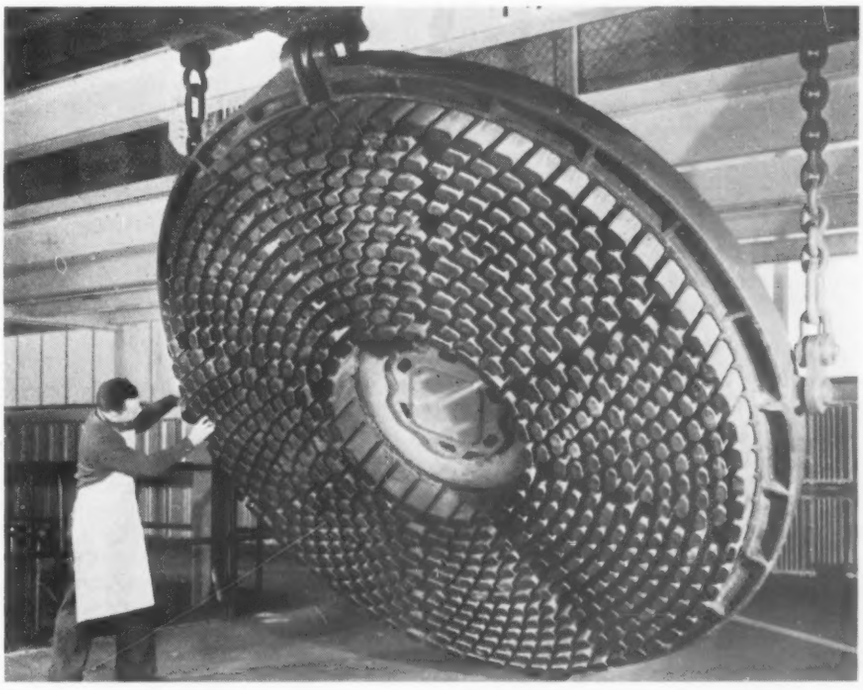
A walkout of 200 men at the Plymouth plant Tuesday followed an attempt to discipline a union shop committeeman who had been called on the carpet four times previously for insubordination. The plant continued operations despite this interruption on motor assemblies.

A scheduled "dues drive" at the Kercheval avenue plant of Chrysler Wednesday was called off, but a demonstration was held to advertise a mass meeting Friday.

A 1-hour strike in the body frame division of Briggs' Mack avenue plant Monday resulted from disciplining a union shop steward. Meanwhile the UAW held "dues drives" at Briggs' Highland Park plant, and

BY A. H. ALLEN
Detroit Editor, STEEL

Disk with 664 Teeth Grinds Safety Glass



■ **This enormous 664-tooth disk is one of the 60 "runners" which grind sand over sheets of glass to smooth it, one of the first steps in making safety glass at Ford Motor Co.'s plant, Dearborn, Mich. The runner weighs 23,700 pounds, but its rows of iron teeth wear away rapidly during the grinding process, one ounce of iron being lost for every 16 ounces of glass removed. Sand is fed to the runners from a complicated levigation system which separates it into 24 grades. About 200 tons of sand is required daily**

planned to conduct them at two other divisions of the company later in the week.

Lost time and wages were all striking employes realized from a strike at plants of Peninsular Metal Products Co., which has been adjusted.

What is the answer? Are local, state and national law-enforcing agencies going to stand idly by and countenance what is nothing more than extortion practiced on employes by a labor union? Shall the right to work be negated in the interests of replenishing union treasuries? Shall management be deprived of all vestige of control over employes? Shall small gangs of muscle-men deprive thousands of jobs which they want and need?

Until these questions are answered there seems to be small hope of any broad-scale peace and progress in the automobile industry. The industry's position is well summarized in the statement by Mr. Knudsen relative to the Flint situation:

"The corporation has kept its agreement with the union. It has no demands before it dealing with the Flint situation. It does not propose to overlook this latest development to obtain a closed shop by coercive methods. Men can work in our plants whether they belong to the union or not. The agreement expressly states that there shall be no coercion or intimidation of any kind."

The government's position may be inferred from the vague generalization made by Governor Murphy who, after a conference with a federal labor conciliator, said, "I feel very strongly that parties to labor agreements ought to be sensitive to their responsibilities in view of general conditions in the country. Both sides should lean backward and err on the side of good faith and fidelity."

A spokesman for the UAW stated with regard to the Flint uprising, "Our dues collections have far exceeded expectations and since there are so few nonunion members left in the plant we do not believe they would do us any good, or the company either."

■ AS MIGHT be expected, activity in the industrial building field has dwindled to practically nothing in this district. Plans for a new paper products plant nearby Detroit have been tabled. A proposed addition to one of the large engineering division headquarters of an automobile company has been shelved, primarily because of the delicate labor situation and the sharp decline in profits over the past six months.

L. A. Young, chairman, L. A. Young Spring & Wire Co., has purchased at bankruptcy sale the recently modernized plant of Ecorse Foundry Co., this being a personal, not corporate, acquisition. A spokesman for Mr. Young states he has no plans for operating the plant, either in its present form or under any changed status.

Norge division of Borg-Warner Corp. is spending $500,000 for ovens, conveyors, presses, welders and other equipment to be installed at its Muskegon Heights plant. A three-month program of modernization has been moved up ahead of a $400,000 building project at Muskegon Heights.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,744
Feb.	300,810	383,900	202,872
March	438,943	519,022	†265,000
April	527,625	553,231	.....
May	480,518	540,377	.....
June	469,368	521,153	.....
July	451,206	456,909	.....
Aug.	275,934	405,072	.....
Sept.	139,820	175,630	.....
Oct.	230,049	337,979	.....
Nov.	405,799	376,629	.....
Dec.	518,958	346,886	.....
Year	4,616,274	5,015,974	.....

†Estimated.

Week ended	
March 26	56,800
April 2	57,500
April 9	60,975
April 16	62,021

(Production figures for the week ended April 23 will be found on page 21).

■ CONSENSUS on 1939 models, judging from inquiries now on hand, is that economy is going to be the watchword on nearly everything for next year's jobs. From every angle, engineers and designers are driving for lower costs, even to the extent of some stinting on material where this can be done without adverse effect on appearance or performance. This may infer a possible change in some price structures, since it is becoming apparent the industry is going to stand pat on prices for 1938 models.

Wage levels in automobile plants have been unaffected as yet, but pressure is developing because of reductions in rates at many parts plants. However, the prevailing philosophy in motordom is to maintain high wages and effect economies in production methods, and it may well be that there is no intention to disturb present wages.

Activity among local tool and die shops is estimated to be at about 50 per cent of capacity, compared with 80-90 per cent at this time last year. A number of the smaller shops are operating night shifts for the first time in many months. Bulk of present work is accounted for by Fisher Body, Ternstedt and Nash programs, and several additional programs are at the "white hot" stage. Some Chrysler division fender work is reported in progress, but the bulk of Chrysler's program is yet to be released. Cadillac-LaSalle's hood and fender program is understood to be ready, and one independent has already placed hood and fender dies.

Reports of serious curtailment in 1939 die programs are not given much credence, since a number of these projects are too far along to be altered appreciably now, Fisher and Ternstedt for example. One significant interruption has been Ford's suspension of development work on the small 105-inch wheelbase model which was being discussed for next year. This may be a temporary holdup or it may be final; no reason for its abandonment has been advanced.

■ PLYMOUTH has introduced a new unit in its deluxe model series—a seven-passenger four-door trunk sedan with 132-inch wheelbase. Gear ratio has been increased from 4:1 to 4.3:1 for reserve power when carrying nine passengers which it is claimed can be transported comfortably. Hudson is announcing a new deluxe model in its 112 series.

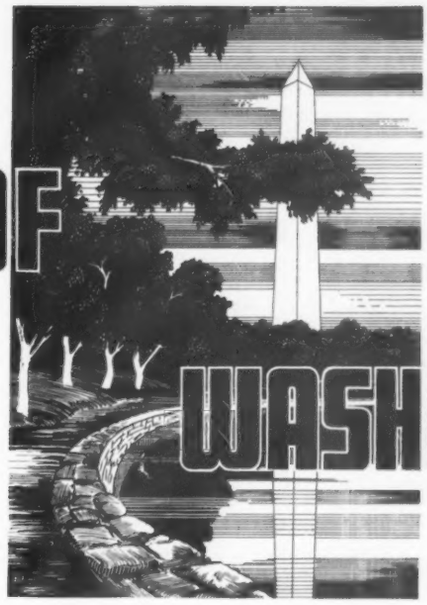
Twelve parts companies in this district have formed a Used Car Appearance Reconditioning institute, and will hold a private demonstration this week of equipment and methods for reconditioning used cars. It is directed to dealers.

That the auto parts industry has weathered the worst of the current recession is the belief of C. O. Miniger, chairman of Electric Auto-Lite Co., Toledo, O., and a director of City Auto Stamping Co., Toledo. The latter company has been operating at 30 per cent of capacity in recent months, but has been able to show small earnings, a noteworthy fact. Mr. Miniger estimated parts manufacture during the second quarter will average 50 to 55 per cent of capacity.

■ STATISTICAL sidelight on the increasing use of rubber in automobiles is the information that De Soto makes use of 35-40 pounds of rubber per car, in 272 places, exclusive of tires and tubes.

Pontiac historians have discovered the fact there was a Pontiac model on the market in 1904, output aggregating 50 to 60 one-seat models, with 2-cylinder engine and steel-rimmed wheels. An instruction book accompanying the vehicle stated pungently: "There is absolutely nothing of a complicated nature in connection with the operation of a Pontiac, and with a little perseverance anyone of ordinary intelligence can easily become an expert."

WINDOWS OF WASHINGTON



BY L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ A FAVORABLE report has been ordered by the house committee on labor on the wages and hours bill, in which all differentials are said to have been eliminated. The report has not been submitted, but it is understood that a 25-cents an hour minimum wage and a 44-hour week have been set. The committee rejected the compromise bill prepared by the Ramspeck subcommittee. There is no telling when action will be taken on this bill, but there is considerable doubt the bill will become law at the present session of congress.

William Green, president of the A. F. of L., has sent a letter to the house labor committee in which he accepts the initial low minimum wage and the 44-hour limit on the basis that the proposed bill embodies some of the fundamental requirements which he claims have been sought by the A. F. of L., and calls attention to the fact that these are "a specific and universal floor for wages, a specific and universal ceiling for hours and provision for enforcement by the department of justice."

Chance for Improvement

In discussing this bill further, President Green says: "In some particulars we believe the bill can be improved. We believe the 25-cents an hour minimum wage is too low to begin with and the 44-hour week to long even as a start. It is true the bill provides that these rates be stepped up until a 40-cents an hour 40-hour week is reached at the end of three years. But why postpone these benefits? The country needs them now.

"At this moment, when the nation is suffering from curtailed purchasing power and widespread unemployment, a really effective wage and hour bill should prove most beneficial. We believe it would be sound common sense to adopt a bill providing a minimum wage of not less than 30 cents an hour to begin with and a maximum work week of 40 hours."

ARMY MACHINE TOOL NEEDS PROVIDED FOR

The war department appropriation bill for the coming fiscal year, effective July 1 next, contains an appropriation for $6,000,000 for what is termed special machinery.

While details of this so-called special machinery are not available, it is understood that at least $2,000,000 will be used for purchase of machine tools. In the national defense message the President sent to congress some weeks ago, he made mention of special machinery for the army, and as that message reached congress about the time the war department appropriation bill was being worked out, the additional $6,000,000 was put into the regular bill rather than in any special appropriation bill for national defense.

It looks, therefore, as though machine tool manufacturers will obtain some business from national defense branches of the government, because the navy will also spend several million of dollars for machine tools in bringing machine tool equipment as nearly up to date as possible.

SENATE NAVAL BILL CALLS FOR A BILLION

The senate is in the midst of discussion on the proposed law for increasing the navy, as the result of the special message of the President. There is considerable controversy over some provisions of the bill as reported by the naval affairs committee, which is so different from the measure passed by the house that it will be necessary to send it to conference.

Among other things, the bill increases the number and tonnage allowances of combatant vessels by approximately 20 per cent. It authorizes the President to build up the navy to the authorized strength, including replacement of vessels as they become over age, and authorizes the construction of 26 auxiliary vessels, three destroyer tenders, two submarine tenders, three large seaplane tenders, seven small seaplane tenders, one repair ship, four oil tankers, one mine layer, three mine sweepers, and two fleet tugs.

The bill also authorizes necessary appropriation, including sums necessary to provide essential equipment and facilities at navy yards, for building any ship or ships which have been authorized.

The estimated cost over a period of years is $1,100,000,000. Of this, $8,000,000 would provide for additional equipment and facilities at navy yards, including machine tools.

RFC LOANS TO INDUSTRY PUT ON LONG TERM BASIS

Jesse H. Jones, chairman of the RFC, in an address last week on activities of his organization, gave considerable attention to the broadened powers granted under the recent congressional act.

Among other things, Mr. Jones pointed out that the RFC may now loan on longer maturity and called attention to the fact that "this authorization will be particularly helpful in industrial loans for plant construction and new equipment, in other words, in extending long-time credit to industry." Dealing further with this subject, Mr. Jones said:

"The objective of the law is to

aid business through increasing employment, and our loans will be made with that in view. The law requires that loans must be secured, but may be upon such terms and conditions and for such length of time as, in the opinion of our board of directors, are appropriate to the particular application.

"While our purpose will be to make business and industrial loans that will maintain or create work, we will not feel authorized to make such loans unless in our opinion the borrower will be able to pay the money back. Too much debt and inflation of values were the principal causes of the 1929 collapse, and prudent borrowing is just as essential as prudent lending.

"It does no good to lend a man, or a business, money which he will lose. It merely postpones the inevitable readjustment of his affairs. This does not mean that we are not making every effort to lend to deserving borrowers, particularly where employment will be maintained or increased. We try to find a way to authorize every such loan for which we have an application."

HEAVY INVENTORY BLAMED FOR SLOW SPRING UPTURN

The department of agriculture issued a statement last week dealing with demand and price situation. It attributes to several causes the failure of industrial activity to experience the usual spring upturn.

The department says: "Expectations of a substantial increase in buying of various industrial goods as inventories became depleted were not borne out, although there was some improvement in such varied lines as steel, textiles and shoes. Retail sales, however, continued well above the apparent total production of finished consumers' goods, and the apparent utilization of many semifinished products, such as steel, in quantities materially greater than current output.

"Evidently, during the past year, available indications of inventories and advance buying have led to underestimating the inventory situation, and stocks on hand must have been much greater than was at first thought. Sales have been declining more rapidly in recent weeks, and might reach a point at which even the present reduced levels of output of many goods would be excessive.

"One of the most important factors in the present situation is the automobile industry. Production of automobiles has held about steady, in contrast to the usual sharp seasonal upswing at this time of the year, although sales have picked up enough to reduce dealers' stocks to more normal proportions.

"In addition to affecting the buying power of persons employed in the industry, the low level of automobile production has enabled manufacturers to continue operations without placing large orders for steel and other materials which usually contribute much to general industrial activity at this time of the year.

"The trade still hopefully looks for a late spring and early summer pick-up in the sale and production of automobiles, but if this fails to materialize little if any increase in total industrial production is likely to occur in the next several months."

CUBA, SOUTH AFRICA TO LIMIT SCRAP EXPORTS

By the terms of a governmental decree recently published in Cuba, exports of "scrap cast iron" from that country have been prohibited for a period of 18 months, effective April 5, according to a report to the department of commerce from the office of the American commercial attache at Habana.

The decree stated that the embargo was established to protect foundries in Cuba and to prevent difficulties which might be encountered in obtaining an adequate supply of scrap for local consumption.

The South African Board of Trade and Industries has recommended to the government that the export of all "wrought iron, steel, and cast iron scrap" be prohibited, except under license, according to a report to the department of commerce from the office of the American commercial attache at Johannesburg.

According to the board, the country's scrap shortage is becoming acute and, despite the fact that the industry is sparing no effort to meet the difficult position, it appears certain that the industry will not succeed in obtaining its requirements in South Africa after May 31, 1938, the report stated.

South African exports of scrap rose from 3000 tons valued at $18,485 in 1933 to 10,930 tons valued at $215,000 during the first 11 months of 1937.

NEW CEMENT BUYING PLAN WATCHED WITH INTEREST

Considerable interest has been shown in cement prices received by the procurement division of the treasury department under the new plan of buying the product at mills rather than at destination.

At his press conference last week Attorney General Cummings, who has been interested in the cement basing point situation, stated that he had not been asked for a ruling on this matter from the procurement division. It is understood, also, that the federal trade commission, which is now carrying on a case in the cement industry, was not advised of the new plan.

The treasury department received a number of bids from cement manufacturers who were willing to sell at mills.

For the purpose of bidding, the country was divided into 47 zones and sub-zones. Manufacturers in or near each zone were invited to bid unit prices for supplying cement to the government and its contractors within the zone. The prices which the treasury department received are to remain in effect from May 1 to Aug. 31, but may be changed on notice after that time.

It will be recalled that some time ago Secretary Ickes charged the cement industry as well as the steel industry with collusive bidding on government contracts, asserting that bids from all manufacturers, regardless of distance from destination, were the same. After refusal of mills to give him a mill price, he retaliated by ordering from the manufacturer whose plant was farthest from the point where the cement was to be used.

The federal trade commission has a complaint pending against the cement institute and its members, representing nearly all the Portland cement industry, that they may have violated the Clayton anti-trust and the Robinson-Patman price discrimination bills.

TO MAKE CIO PERMANENT

During the meeting here last week of the CIO, arrangements were made for a permanent organization of that body, for which a convention will be held this year.

Philip Murray, chairman of the SWOC, was elected a vice chairman of the CIO. The meeting appointed four standing committees to study and report on the problems of unemployment, housing, social security, and legislation.

RATE RULING EXTENDED

A second decision has been made by the interstate commerce commission in connection with iron and steel rates in the South.

Following a further hearing the commission states that relief from the long-and-short-haul provision of section 4 of the interstate commerce act, in connection with rates on iron and steel articles in carloads, from points in southern territory to destinations on the border between south and official territories, which has already been granted, is authorized to be continued and the relief authorized in the former provision has been modified to include rates from points in southern territory, Suffolk, Petersburg, and Hopewell, Va.

Steel Trims its Sails to Prevailing Wind; Greater Efficiency Balances Drawbacks

■ AN IMPRESSIVE manifestation in industry in recent months is the growing disposition to view current conditions realistically. Instead of waiting and hoping for more favorable conditions, business leaders in increasing numbers have taken positive, sweeping action to meet conditions as they are, in order to insure the continued existence of their companies.

This spirit of adjusting to the times is reflected notably by the steel industry. Analyses of reports covering operations during the first quarter of 1938 reveal that some companies now are able to show a profit on operations as low as 35 per cent of capacity. This result has been brought about by elimination of wasteful and inefficient practices. Studies which continue in effect indicate further economies can be expected in coming months.

Waste Elimination Gives Profit Despite Tax, Wage Burden

The magnitude of this performance is understood when it is borne in mind that the recent rise in steel prices has not been at all proportionate to the increase in unit items that underlie production costs. Taxes paid by the steel industry in 1937 reflected an increase of 60 per cent over 1936 and were equal to 42 per cent of the industry's net earnings. Wages paid by the industry have risen 31 per cent since October of 1936. In the same period STEEL's composite of finished steel prices, embracing plates, shapes, bars, hot strip, nails, tin plate and pipe, moved up only 16 per cent.

Thus the steel industry has reached its present favorable position while at the same time following the time-honored policy of sharing its savings with its customers.

While the future is shrouded in numerous uncertainties, certain broad deductions seem warranted. Resistance to reduction of present high unit wage rates continues great. The current rate of taxation is unlikely to be reduced for a long time to come. These factors mean that production costs can be lowered only by eliminating waste and inefficiency.

"Pay as You Go", Is Keynote; Can't Depend on Fat Years

It continues a fact that the country needs a revised labor relations law, sound tax policies, a balanced budget, encouragement to private investors and many other correctives before industry again can be expected to forge ahead to new heights of prosperity. Without such fundamental correctives government pump priming can bring only temporary improvement.

But business is not warranted in pursuing a waiting attitude. The immediate need is for adjustment to current conditions. If business is to weather present storms it must follow a pay-as-you-go policy, particularly because the fate of the undistributed profits tax is uncertain, making it unsafe to follow the old policy of preparing in times that are fat for times that are lean.

History of the United States records many crises, some of which threatened the country's very existence. We have come through them all. While the aftermath of the present chapter is yet to be revealed, it is clear that we are entering a period of high industrial efficiency. Though present conditions constitute a hard taskmaster, they should not prevent enterprising and aggressive managements from maintaining a sound position.

Trend of Industrial Activity Continues Listless

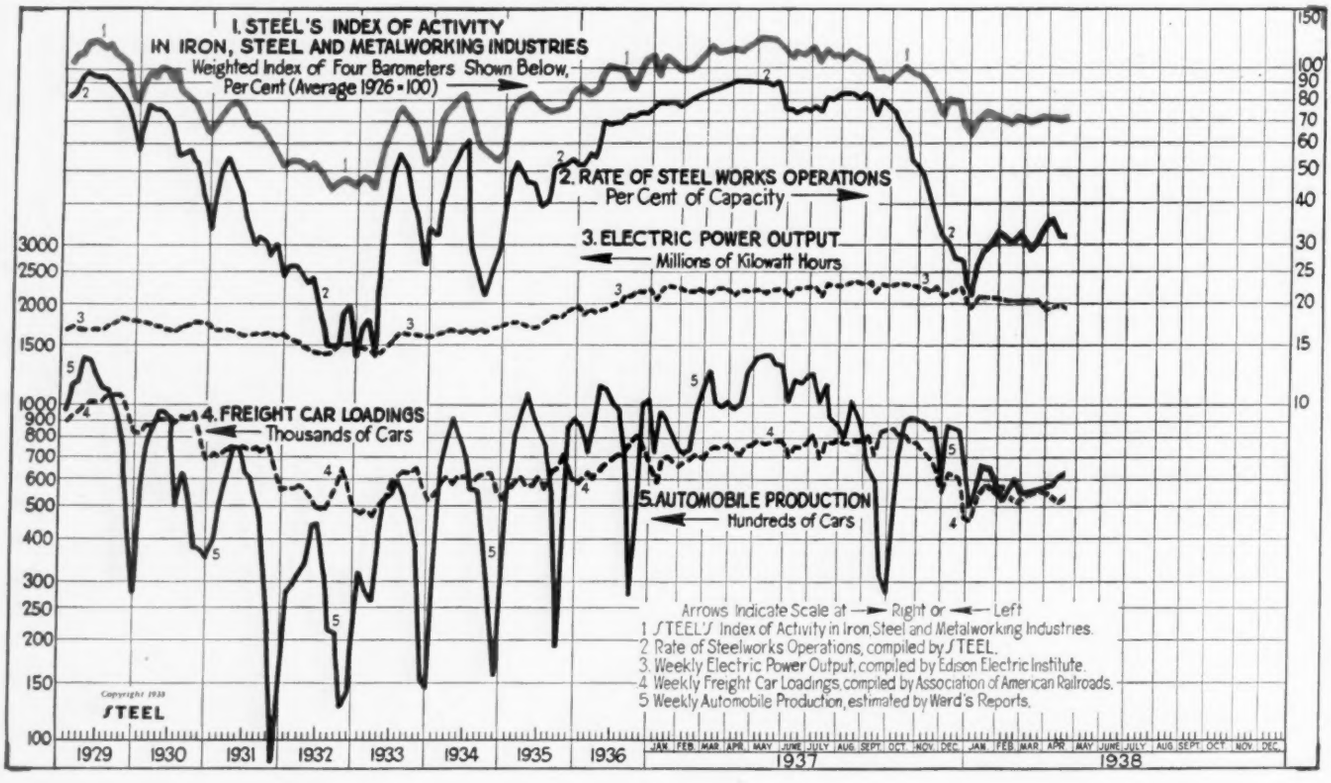
■ A MODERATE improvement in two of the four barometers composing STEEL's index of activity in the iron, steel and metalworking industries was reported for the week ended April 16. As a result, STEEL's index, which has been in a listless downward movement since the week ended March 26, registered a feeble gain of 0.3 points to 71.6 per cent.

The rate of steelworks operations remained unchanged at 32.0 per cent in the week ended April 16, although there are indications that it may recede into lower levels within the next few weeks.

Revenue freight carloadings reversed the downward movement since the week ended March 26 to register a substantial gain to approximately 548,000 cars in the week ended April 16. Electric power output declined to 1,957,573,000 kilowatt-hours after showing moderate gains for two consecutive weeks from the low this year of 1,975,239,000 kilowatt-hours in the week ended March 26. The output for the week ending April 16 not only represents a new low for this year but also is the lowest level recorded since the week ended July 4, 1936.

Business sentiment has improved somewhat on the basis of continued increase in auto output the last two weeks. However, labor difficulties have hampered operations on some assembly lines.

The general outlook for industrial activity still continues uncertain, due largely to a stalemate as to government recovery policies.


1. STEEL'S INDEX OF ACTIVITY IN IRON, STEEL AND METALWORKING INDUSTRIES
Weighted Index of Four Barometers Shown Below, Per Cent (Average 1926 - 100)
2. RATE OF STEEL WORKS OPERATIONS
Per Cent of Capacity
3. ELECTRIC POWER OUTPUT
Millions of Kilowatt Hours
4. FREIGHT CAR LOADINGS
Thousands of Cars
5. AUTOMOBILE PRODUCTION
Hundreds of Cars
Arrows Indicate Scale at → Right or ← Left
1 STEEL'S Index of Activity in Iron, Steel and Metalworking Industries.
2 Rate of Steelworks Operations, compiled by STEEL.
3. Weekly Electric Power Output, compiled by Edison Electric Institute.
4 Weekly Freight Car Loadings, compiled by Association of American Railroads.
5 Weekly Automobile Production, estimated by Ward's Reports.
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1929 1930 1931 1932 1933 1934 1935 1936
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1937
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1938

STEEL'S index of activity gained 0.3 points to 71.6 in the week ended April 16:

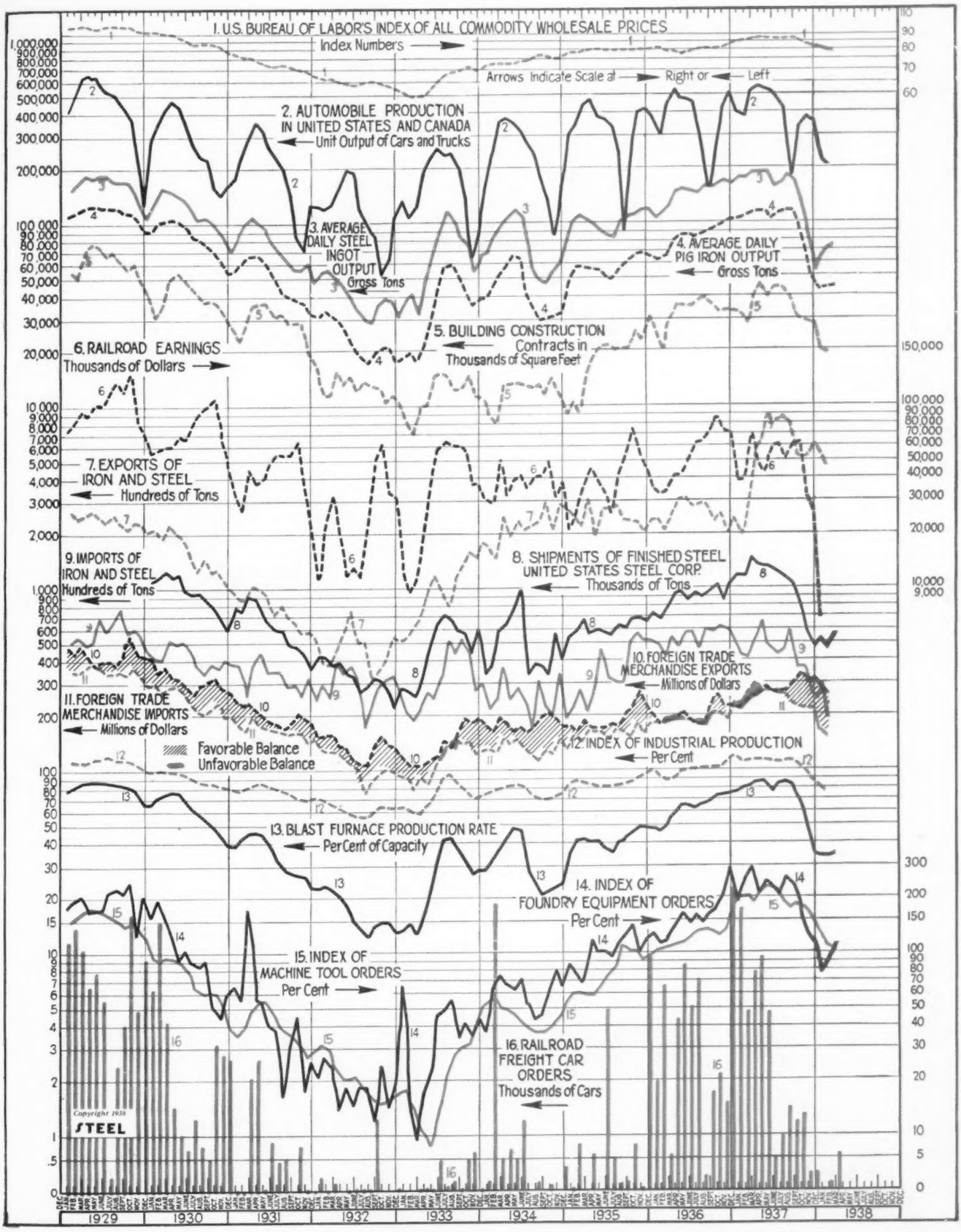
Week ending	STEEL'S Index of Activity Index No. 1938	1937	Steelworks Operating Rate Per Cent 1938	1937	Electric Power Output Million KWH 1938	1937	Freight Car Loadings 1938	1937	Weekly Auto Output 1938	1937
Jan. 15	74.4	106.7	29.0	79.0	2,115	2,264	580,600	700,238	65,735	91,685
Jan. 22	74.7	104.0	30.5	80.0	2,108	2,256	570,333	670,376	65,418	81,395
Jan. 29	73.8	99.6	33.0	76.0	2,098	2,214	553,176	659,790	59,365	74,148
Feb. 5	70.9	100.8	31.0	79.5	2,082	2,201	564,740	675,026	51,443	72,295
Feb. 12	71.2	101.9	30.0	81.0	2,052	2,199	542,991	691,618	57,810	72,850
Feb. 19	71.9	108.8	31.0	83.0	2,059	2,211	535,790	714,884	59,100	95,698
Feb. 26	70.3	112.8	30.5	84.0	2,031	2,207	511,930	696,727	56,977	111,915
Mar. 5	70.1	117.9	29.5	86.0	2,035	2,199	552,916	734,127	54,440	126,975
Mar. 12	70.8	112.7	30.0	87.0	2,014	2,212	556,664	748,993	57,438	101,684
Mar. 19	71.3	113.1	32.0	89.0	2,017	2,211	540,332	759,269	57,555	99,013
Mar. 26	72.4	114.0	35.0	90.0	1,975	2,200	572,952	761,109	56,800	101,046
Apr. 2	72.0	112.0	36.0	91.5	1,978	2,146	523,489	726,687	57,500	97,005
Apr. 9	71.3†	112.8	32.0	91.5	1,990	2,176	521,978†	716,044	60,975	99,196
Apr. 16	71.6*	119.6	32.0	91.5	1,957	2,173	548,076*	751,328	62,021	125,472

*Preliminary. †Revised.

STREND

Key:	Feb. 1938	Key:	Feb 1938	Key:	Feb. 1938	Key:	Feb. 1938
1	79.7	5	18,903,000	9	19,589	13	34.5*
2	202,872	6	2,136,481‡	10	262,733,000	14	114.6*
3	74,513*	7	460,640	11	163,085,000	15	100.4*
4	47,851*	8	572,192*	12	79.4*	16	680*

*March. ‡Deficit (not shown on chart).



Key: 1. U. S. Bureau of Labor's Index of all Commodity Wholesale Prices. 2. Automobile Production in United States and Canada, compiled by U. S. Department of Commerce. 3. Average Daily Steel Ingot Output, compiled by American Iron and Steel Institute. 4. Average Daily Pig Iron Output, compiled by STEEL. 5. Building Construction, Contract Awards in 37 States, compiled by F. W. Dodge Corp. 6. Railroad Earnings, Net Operating Income for Class I Roads, compiled by Bureau of Railroad Economics. 7 and 9. Iron and Steel Foreign Trade, reported by Bureau of Foreign and Domestic Commerce. 8. Shipments of Finished Steel, United States Steel Corp. 10 and 11. Foreign Trade, Value of Exports and Imports, reported by Bureau of Foreign and Domestic Commerce. 12. Index of Industrial Production (adjusted for seasonal variation; average 1923-25=100) computed by Federal Reserve Board. 13. Blast Furnace Production Rate, compiled by STEEL. 14. Index of Foundry Equipment Orders (Average 1922-24=100), compiled by American Foundry Equipment association. 15. Index of Machine Tool Orders (Three-month moving average; average monthly shipments 1926=100), compiled by National Machine Tool Builders association. 16. Railroad Freight Car Orders, compiled by STEEL.

Adds 56-Inch Strip Mill

Maximum widths produced in new plant include 48 inches for No. 16 gage and heavier strip, 42 inches for No. 18 gage, 36 inches for No. 19 gage. Skelp is made in 15 to 30-foot lengths

By C. R. FOX
Superintendent
Hot Strip Mill
Maryland Plant
Bethlehem Steel Co.

■ BETHLEHEM Steel Company's new continuous hot strip, sheet and plate mill at Sparrows Point, Md., designed for an annual capacity of 600,000 gross tons, is an important addition to Bethlehem production facilities. Covering 14 acres under roof, about one third of the output of the new mill will be taken by the company's adjoining tin mills, the remainder going to market.

Buildings utilize standard steel frame construction with walls of brick and glass. Buildings housing hot operations have hip roofs covered with asbestos-protected metal. Where light is important, flat high and low bay roofs of insulated steel deck construction are found. Most floors are concrete except for brick used in coil storage and around picklers and the wood-block floors in roll shop and strip processing building.

All motors and gear drives for mill, motor-generator sets and auxiliary equipment are in a motor room, 65 x 525 feet, equipped with a 25-ton crane and 5-ton auxiliary. Variable frequency room, 20½ x 175 feet, is alongside the hot strip building. Roll shop, 65 x 100 feet, is in one end of motor room and is separated from it by a brick wall and rolling partition so a common 50-ton crane and 10-ton auxiliary can be used for both. Two roll grinders, one 60 inches by 24 feet and one 24 inches by 16 feet, are provided. Two air compressors also are in this room.

Slab storage building, 90 x 825 feet, can accommodate 15,000 gross tons of slabs which are handled by three 25-ton, 85-foot span cranes with 10-ton auxiliaries. Slabs come from blooming mill on a depressed track running the entire length of the slab yard. Cars are standard gage of special design to facilitate loading and unloading.

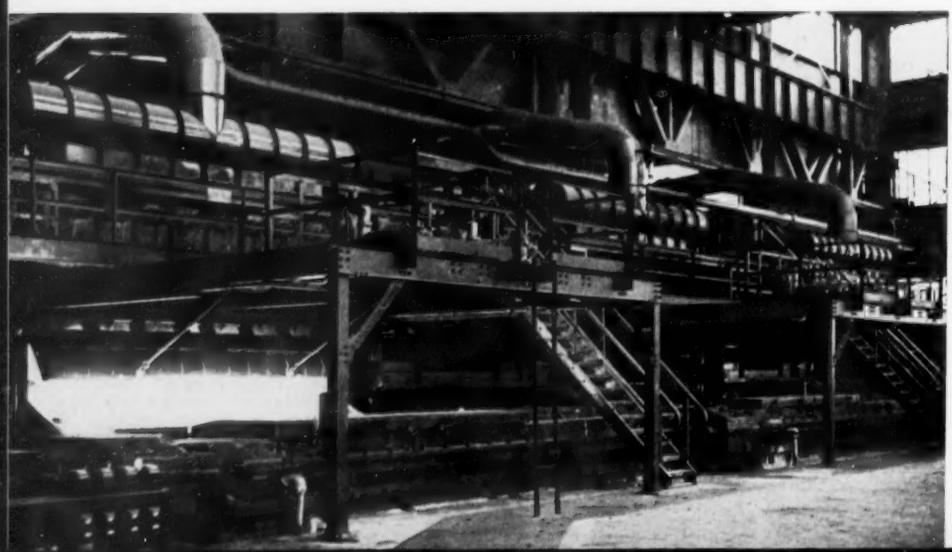
Scarfing bed, 250 x 40 feet, is used in removing seams and surface defects. A 7½-ton hoist with double magnets distributes slabs on scarfing beds and stock piles. Acetylene for scarfing torches is generated in an adjoining building, 26½ x 100 feet. Gas for other purposes is piped where needed. Oxygen is supplied from trailer trucks.

Slabs go to three heating furnaces on a charging table, 162 x 5½ feet, which consists of three sections, each driven by a 50-horsepower motor. Magazine lift and pusher is driven by a 35-horsepower motor through a rack and pinion. Two pushers feed either one or two rows of slabs through each furnace. Two 50-horsepower motors driving pushers on each furnace are controlled by a signal light system electrically interlocked with discharge doors. Charging doors are manually operated.

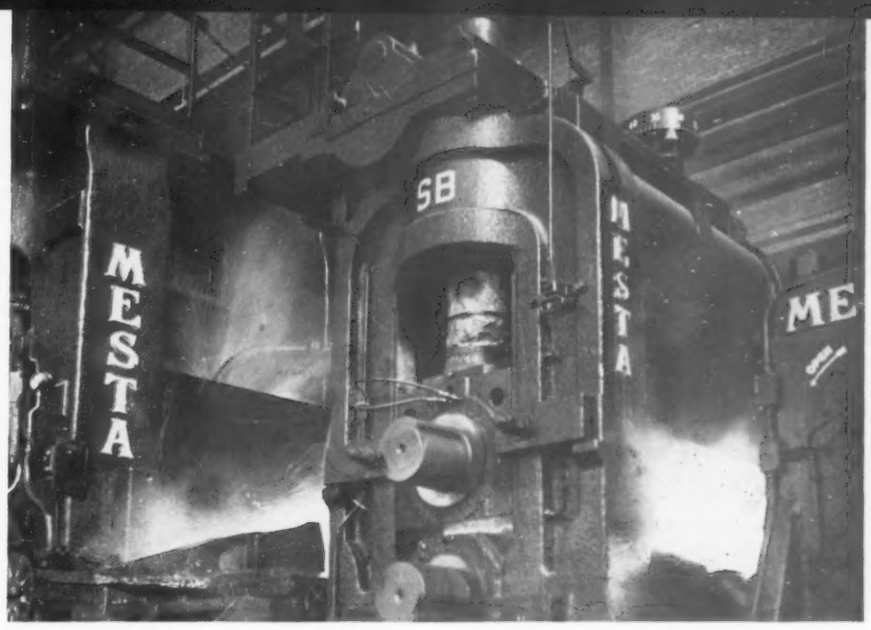
Have Insulated Roofs

Slab heaters are recuperative, triple-fired 2-zone type with an effective hearth area, 80 x 18 feet, 9 feet 8 inches above the floor. They have insulated suspended-arch roofs, and are designed for top and bottom firing in primary zone, which has 12 steam-atomizing oil burners, six above and six below the steel. Secondary zone or soaking hearth is 16 feet 9 inches long with eight burners, all above the steel. Special nonspalling brick minimizes chances of particles falling on slabs.

Furnace air is heated in tile recuperators, one under each furnace. A hot air fan capable of delivering 37,500 cubic feet of air at 600 degrees Fahr. against a static pressure of 2½ inches of water is provided for each furnace. A slight



Discharging a slab from a heating furnace



Scale breaker ahead of finishing stands

pressure is maintained inside furnaces to prevent infiltration of air.

Slabs up to 7½ feet long, double row, or 16 feet long, single row, can be accommodated. Width of slabs varies from 14 to 50 inches, maximum thickness is 5½ inches. Capacity per furnace is 55 gross tons per hour, the three furnaces heating 165 tons. Bunker C fuel oil is used, a 2500-gallon-per-hour pumping system located in the basement being employed to circulate it.

Instruments on furnace control boards include furnace pressure gage and pressure regulator, air-fuel ratio regulator for each firing zone (top, bottom and soaking zones in each furnace), electric recording oil flow meter for each zone, two mechanical oil flow meters for whole system—one at inlet, other at outlet. Difference in readings represents total fuel consumption for all furnaces. Other equipment includes a 3-point potentiometer recording temperature of flue gas entering each side of recuperator and gas leaving recuperator, and a potentiometer to control and record air temperature to burners.

Hydraulic tilting table at end of furnace table delivers slabs to an electric car operating between the slab yard and hot mill building enabling slabs which have been delayed to be disposed of quickly or to be recharged to avoid shorting an order.

Use 60-Ton Cranes

Hot mill building, 88 x 785 feet, is served by two 60-ton cranes with 20-ton auxiliaries. Slabs at 2250 degrees Fahr. are discharged from furnaces to a table, 115 feet long, 5 feet 1 inch between sideguards and driven in four sections by 50-horsepower motors. Slabs first go through a 40-inch vertical edging mill of the overhung type, driven by two 300-horsepower motors. Here the width may be reduced as much as 2 inches. Space is provided for a horizontal scale breaker ahead of edger but none is used now. Leaving the edger at 183 feet per minute, slabs enter first of four roughing stands, a 2-high mill with rolls of 36-inch diameter and 56-inch body, driven by a 3000-horsepower motor through a single gear reduction. No flywheel is used on any stand.

Three 4-high stands follow, each driven by a 3000-horsepower motor. Twenty-two inch vertical rolls on the entering side are driven by 150-horsepower motors. Width adjustment is from 14 to 52 inches. Working rolls are 25 inches diameter and 58 inches long. Backup rolls are 49 inches diameter and 54 inches long. Reductions in these stands result in slab leaving last roughing stand at 430 feet per minute. Slab is never in more than one roughing stand at any time. Pulpit operator faces the roughing train opposite No. 1 mill and has control of all tables and drives from the heating furnaces to No. 4 stand inclusive. Gage and width adjustments are handled from the floor.

Water sprays at 1000 pounds pressure are employed to clean slabs entering Nos. 1, 2 and 4 roughing stands. Water comes from two 1200-gallon-per-minute centrifugal pumps driven by 1000-horsepower induction motors.

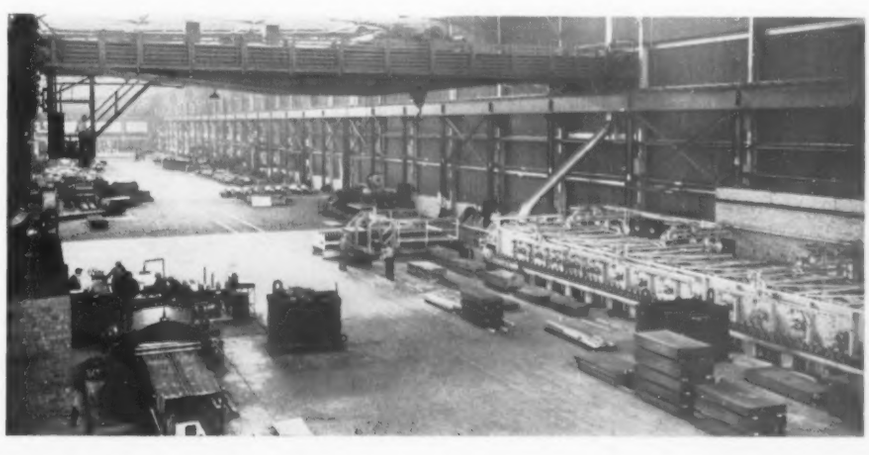
Slabs, now 0.700 to 1.250 inches thick, pass over a 115-foot roller table to finishing train at the entrance to which a rotary shear crops entering end of slab. Another shear at the last roughing stand crops the trailing end of slab so either or both ends may be cropped to prevent wrecks in finishing train and to reduce marking of rolls. Both shears may be operated manually or automatically.

Table between roughing and finishing stands is water cooled and serves to control slab temperature. A recording optical pyrometer with a system of colored lights indicating various temperature ranges aids the operator to attain the desired 1850 to 1950-degree range. At this temperature, slabs pass through horizontal scale breaker, having 24-inch diameter rolls with 56-inch body. High-pressure water sprays remove secondary scale.

Enters Six Final Stands

Leaving the last roughing stand at 114 to 455 feet per minute, pieces enter a train of six 4-high finishing stands with working rolls 24 x 58 inches, backup rolls 49 inches diameter and 54 inches long. A 3000-horsepower motor with dynamic braking and single gear reduction is used on each stand. Mill spindles on all 4-high stands are in two sections, joined with twelve 1¾-inch bolts that are of the shear pin type.

As heavy reductions are employed, a section 50 feet in length may finish 750 feet or longer. Average time in finishing stands is 22 seconds. Speed upon emerging from last stand is from 1038 to 2100 feet per minute. Loopers between all finishing stands take up slack in



View of hot strip processing building with continuous normalizing furnace at right and shear line at left

moving strip. A piece is usually in all finishing stands at the same time. To eliminate scale and dirt, steam is used after each stand.

Grease, automatically pumped into bearings every few seconds, lubricates all mill and table rollers. Screwdown dials on front of each finishing stand indicate space between rolls in thousandths of an inch. Speed pulpit, elevated about 25 feet on the wall facing finishing stands, controls sprays, steam, motor speeds, flying shear, loopers and runout table. A control board opposite last finishing stand carries devices to receive signals from inspectors checking finished product. Instructions also may be sent from this point to various parts of the mill. A recording and indicating pyrometer aids the roller in meeting metallurgical requirements.

Rollers Center Strip

From finishing mill, strip moves over delivery table to coilers and hot sheet pilers. Concave rollers keep strip in center of table. Runout table, 334½ feet long, has 224 individually motor-driven rollers, 12 inches diameter and spaced on 18-inch centers. Strip finishing building, 115 x 1050 feet, has three 25-ton cranes, two of which have 15-ton auxiliaries.

A flying shear beyond the last finishing stand is driven by two 150-horsepower motors. It cuts sheets in sections up to 48 inches wide, ½-inch thick and 11 to 30 feet in length. Strip then moves down the table to an electrically-operated piler 670 feet from the shears. Piler is equipped with horizontal and vertical adjustments which together with a spring-loaded and adjustable end stop insure accurate piling. Formed piles are lowered to a chain conveyor and transferred sidewise to automatic scales and then to storage. Iron castings forming storage bed are arranged to reduce sagging of hot lifts to a minimum.

When rolling coils, hot flying shear crops front end of strip as it comes from last finishing stand. A crop pit with air-operated door is 50 feet ahead. At instant of cropping, an air and electrically-operated high-speed pinch roll, geared to the shear, drops down and throws the crop ahead into the open crop deflector which closes ahead of the oncoming strip. When trailing end is cropped, pinch roll is not used but deflector gate functions as before.

Two hot coilers, about 350 feet from last finishing stand, handle strip up to 48 inches wide and weighing up to 300 pounds per inch of width. Air-operated apron gates direct oncoming strip downward into the coilers where it is wound on a mandrel by electrically-driven rollers. When coil is completed, apron gate closes and coil is rewound to prevent excessive telescoping. Coil comes to rest on center of mandrel, is ejected and deposited on a coil transfer car equipped with two coil baskets or dumps. Air operates extractor, car and baskets. Coil is moved sidewise to place empty basket in position for other coiler, bringing loaded basket in line with coil conveyor. An air cushioned device then deposits coil gently on conveyor.

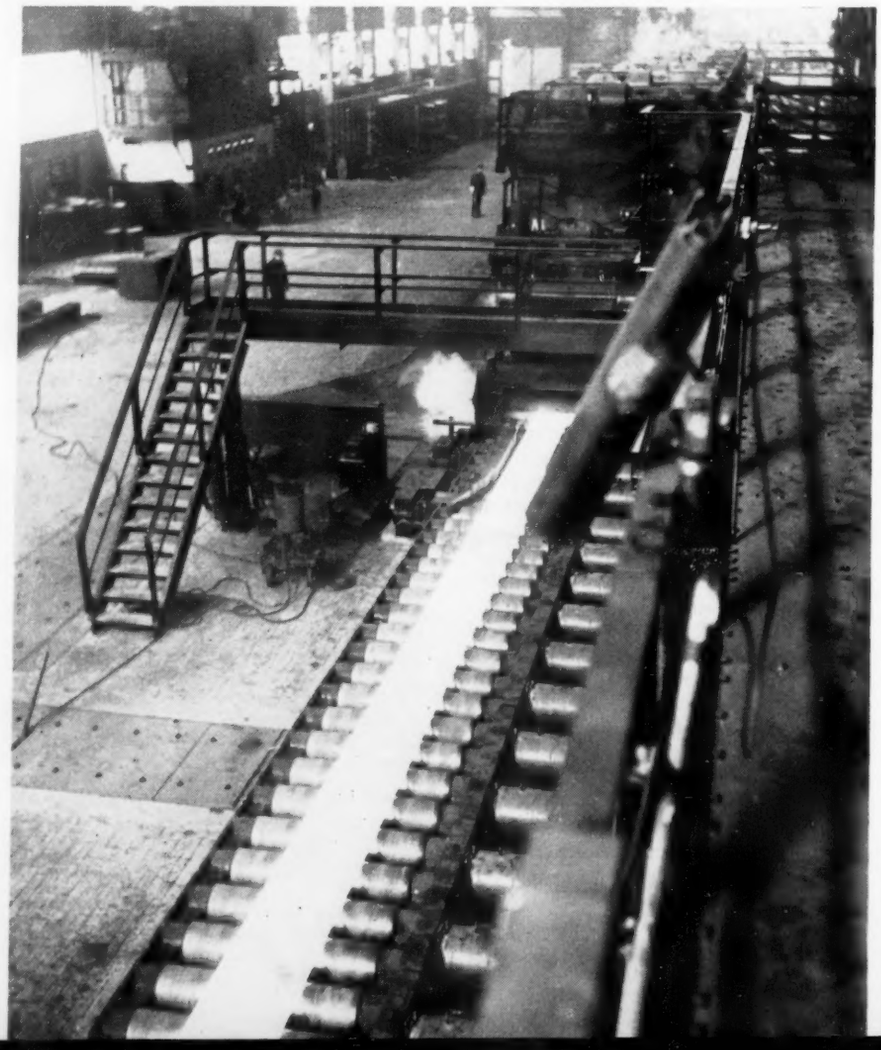
Controls for coilers, transfer car, coil conveyors and tables from mill to piler as well as speed indicators are located in a balcony pulpit placed directly above the conveyor facing the coilers where all operations from last finishing stand to piler can be seen. A newly designed rheostat control, connected through a jockstick and used on the coilers, permits a 25 per cent increase in speed without adjusting the bench board.

Coils pass underground on a 585-foot double chain conveyor where ample opportunity is afforded for self-annealing. First 385 feet of conveyor are in a straight line. Driven skewed rollers then are used to make a 90-degree turn, after which conveyor gradually rises above floor level in coil storage building to deposit coils on a 50-foot gravity conveyor. Coils are weighed on a 20,000-pound scale with registering dial. Coil storage building, 90 x 675 feet, has facilities for 20,000 gross tons, and is equipped with two 15-ton cranes and a 300-foot depressed track. Space in one end provides for a trimming unit, consisting of uncoiler, slitter, recoiler and coil dump.

Two Routes Provided

Two continuous cutup lines in the hot strip finishing building include levelers, trimmers, up-cut shears, pilers, conveyors and other accessories. Two conveyor lines from each turntable make it possible to route material into either finishing bay. No hand-operated sideguards are used, all table sections being of the shift type with properly skewed rollers and tool-steel fixed sideguards.

Strip processing building, 90 x 1225 feet, has two 15-ton cranes, and one 25-ton crane with a 15-ton auxiliary. The continuous normalizing furnace is 150 feet long and consists of a 75-foot heating zone and 75-foot cooling zone. It has a flat arch roof of 9-inch tile, removable in 5-foot sections in both zones and insulated in the heating zone.



Runout table. Strip is coming from roughing stands and going into finishing stands at far end of table. Optical pyrometer on balcony railing is focused on strip to measure temperature at this point

Slab storage has facilities for 15,000 gross tons

Sidewalls are insulated also. Coke oven gas (500 B.t.u.) at a minimum pressure of 20 inches of water is fed to 46 burners. A blower supplies 4600 cubic feet of air per minute. Furnace has a 39-foot table for charging and a 20-foot table for discharging. Material moves through furnace in about 15 minutes on 120 rolls, being heated between 1750 and 1800 degrees Fahr. and then gradually cooled.

Rollers Are Alloy Disks

Sheets are charged double row up to 43 inches or single row up to 86 inches. Rider sheets are used between rolls and stacks of sheets. Rollers are alloy disks mounted on water-cooled shafts. Ventilators above furnace remove fumes and excess heat.

Pickler unit has four balanced arms and is served by rubber-tired buggies equipped with pickle crates, 37 x 183 inches. Seven crates with acid resistance pins and chains are available. Sheets are assembled in lifts, stocked on beds and packed into crates, using 36-inch pins to space individual sheets. Loaded crate is hauled to picklers by tractor, fastened to one of the arms, raised from the buggy, swung 90 degrees and then immersed in a sulphuric acid bath. This is followed by a second acid bath and a water rinse. About five minutes are usually required in each of the three baths.

After pickling, sheets in crates are trucked to scrubbing line in loads averaging 7000 pounds, with sheet sizes up to 48 x 240 inches. Scrubber line has hourly capacity of 25 tons and includes dip tank, water tank, alkali tank, scrubber, runout table, roller leveler and oiler. Sheets are passed from pickle crates to a shift-type feed table equipped with skewed rollers and tool-steel side guards. Oiler is mounted on wheels and runs on a track so it may be moved in or out of line without loss of time. Sheets are piled on a gravity conveyor.

A 2-high mill, 26 x 66 inches, is used for cold rolling pickled or blue anneal sheets. These are fed to the rolls from a bench, then by a belt to a roller leveler and finally to a flat table before piling. This unit also has a movable oiler. When it is used, the flat table is moved ahead to permit placing oiler between mill and flat table so table may be kept close to delivering unit.

Two 2-high skin pass mills and a rotary shear also are in the processing building. These two mills have rolls 28 inches diameter and 55 inches long mounted in roller bearings. One mill is equipped with a sheet charger, tilter, feed belt, delivery belt, roller leveler and conveyors and is used to skin pass sheets or coils, pickled or unpickled. A self-contained hydraulic unit quickly moves the roller leveler from the line on lubricated slides when changing from sheets to coils.

One or both of these units can be used to skin roll coils. Gravity conveyors and coil tilters service the feed reels ahead of the mill. After rolling, material is rewound, picked up on a ram tractor and conveyed to the rotary flying shear where it is cut to desired lengths. This shear is located about 150 feet from the skin pass mills to give ample stocking space for coils. A motor-driven coil box, with slip coupling between motor and drive, feeds the line. Strip leaving coil box feeds through pinch rollers with automatic hold-down device which prevents sheet from bowing to give more accurate trimming. Edge scrap is deflected downward into cutters. Sheet then goes through leveler with 13 rollers and on to the rotary shear.

Three Knives Cut Sheet

Lengths handled by rotary shear range from 59⅜ to 173½ inches when two knives are used. Using three knives reduces these lengths one half. A turntable makes it possible to route material to warehouse and shipping departments. Processing building also includes a resquaring unit, used for gages 0.078-inch and lighter, and a scrubber and dryer unit.

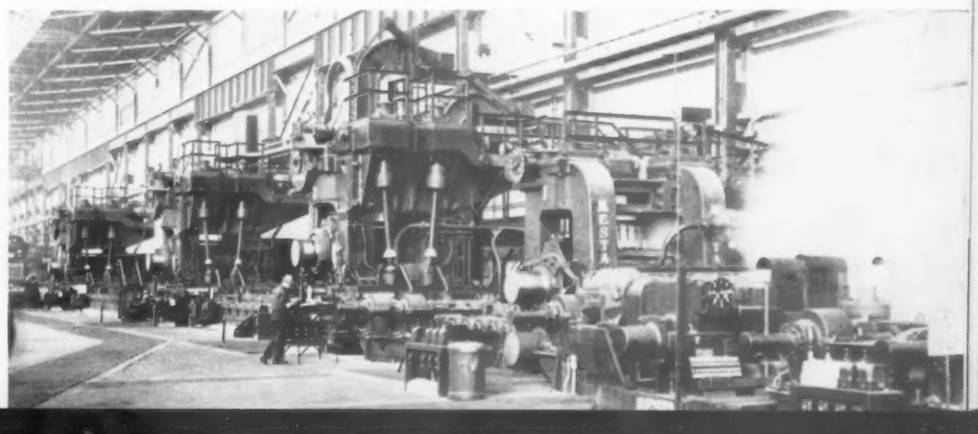
Box annealing department, in a space 90 x 225 feet at one end of warehouse and shipping department, is served by a 25-ton crane with 15-ton auxiliary. Equipment includes 12 bases and four furnace covers of the radiant-tube type. Automatic control for each furnace is provided by pyrometers actuated from thermocouples in the charge.

In use, strip is piled on furnace base, thermocouples inserted at different points and pile covered with a sheet metal shroud. This inner cover rests on a sand seal. Furnace containing gas-fired radiant tubes forming the outer cover then is placed over the inner cover. Sheets 40 x 186 inches can be annealed in double row. Any combination 15,000 square inches in area and 56 inches high represents a full charge. Gas introduced under the cover during annealing prevents deoxidation. Steam blueing also can be done.

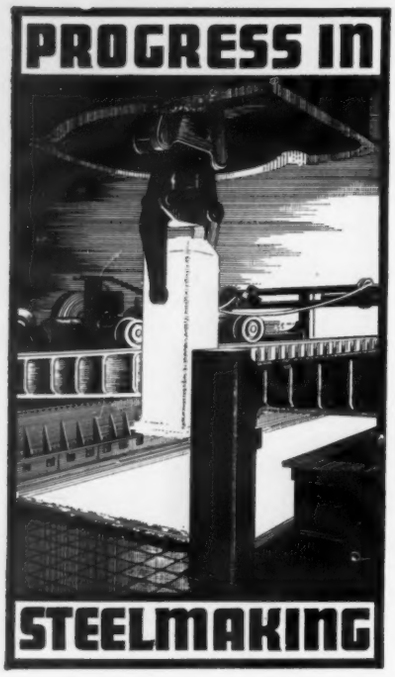
Three resquaring shears, a 4-high leveler, gravity conveyors and knife grinders for straight and circular knives, are additional units available for miscellaneous work.

Warehouse and shipping department is 90 x 825 feet and so provides ample space. It is equipped

(*Please turn to Page* 64)



Vertical edger and four roughing stands



Refractory Arches

Modern furnaces utilize refractory brick arches in roofs, flues and door openings. Proper design insures maximum life and results in lower maintenance costs

PART I

By J. SPOTTS McDOWELL
and
L. L. GILL
Harbison-Walker Refractories Co., Pittsburgh

■ EARLIEST known examples of the true arch are those of the ancient brick-making people of Babylonia dating from three to four thousand years B.C. These arches were employed only below the level of the ground, which formed the abutments at the sides. The Etruscans of Italy adopted the arch twenty-six hundred years ago, in gates, drains and tombs. The Romans made it the most characteristic feature of their monumental architecture. The exterior of the Coliseum is a series of stories of arches. The Romans did not lose sight of the utilitarian value of the arch; the Cloaca Maxima, that great sewer of Rome, is an arched conduit of brick. But the Romans went beyond the simple arch; they conceived the dome and used it in many of their public buildings. The arch, the series of arches, and the dome as well, became heritages from Rome to all the western world. After Roman power crumbled, the architectural traditions survived and the principles once learned were never forgotten.

Although metals have been used for thousands of years, furnace structures for reduction of ores and treatment of metals are of comparatively recent origin. Throughout continental Europe, primitive furnaces were merely pits sunk into the ground and lined with clay or brick. The reverberatory furnace appears to have been introduced into Europe from Turkey about the end of the fifteenth century.

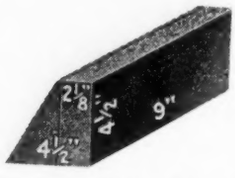


Fig. 2—Skewback built with standard 9-inch featheredge brick of the 2½-inch series

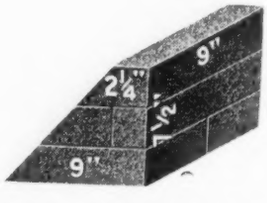


Fig. 3—Skewback built with standard 9-inch sideskew and endskew brick of the 2½-inch series

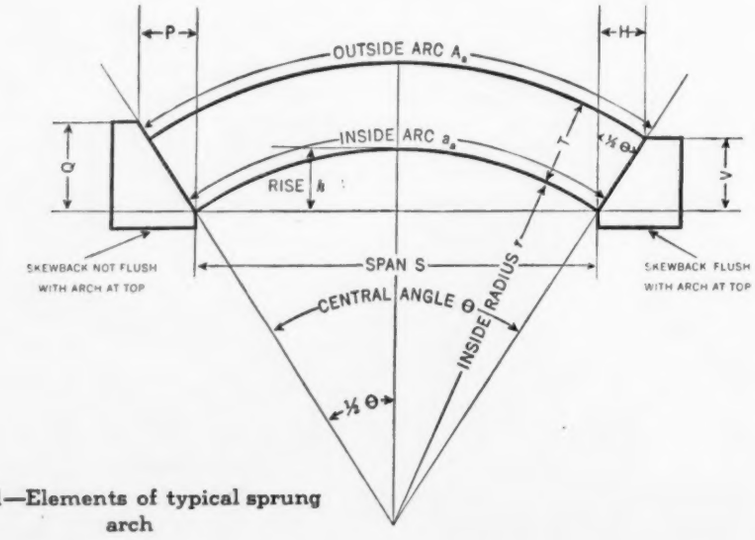


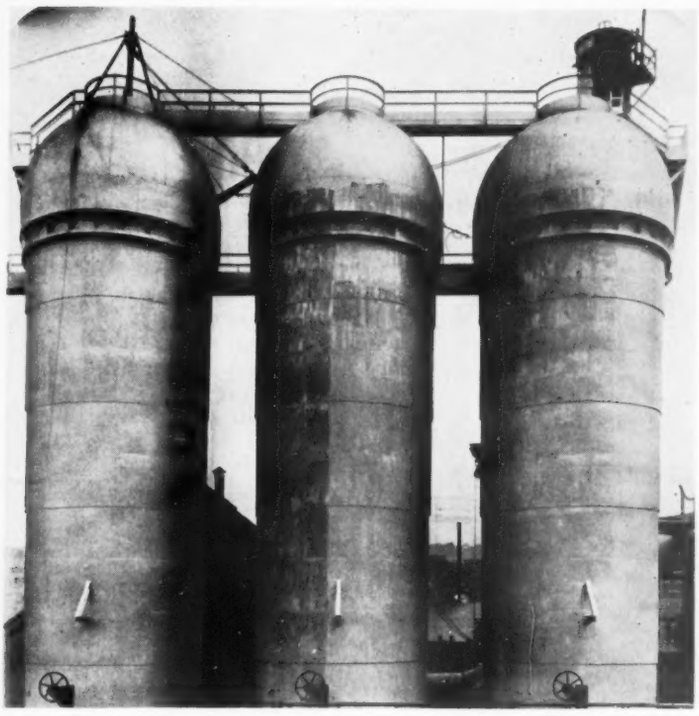
Fig. 1—Elements of typical sprung arch

Today, arches form the roofs of furnaces, of combustion chambers, of flues, and the like; they span firebox, door, and port openings, and they support the weight of superstructures, such as walls and checkerwork.

In a true arch, each block or structural unit has a shape which is predetermined by the design of the whole; it is not even self-supporting until all the others have been fitted with it. The feature which makes this possible is the taper of the blocks. Arches are built with radial joints, and usually with the interior surface following a curved line.

At each end of an arch are mason-

PROGRESS IN BLAST FURNACE STOVE CONSTRUCTION



Patent Pending

THE OPEN JOINT CHECKER

The stove checker with complete positive cross-circulation which equalizes the flow of gas throughout the entire checker chamber.

•

Maximum Brick Weight in hot zones of stove.
Stable Construction;
Channelling Eliminated;
Low Brick and Labor Cost;
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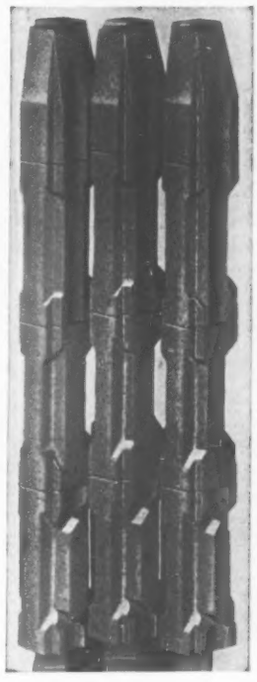
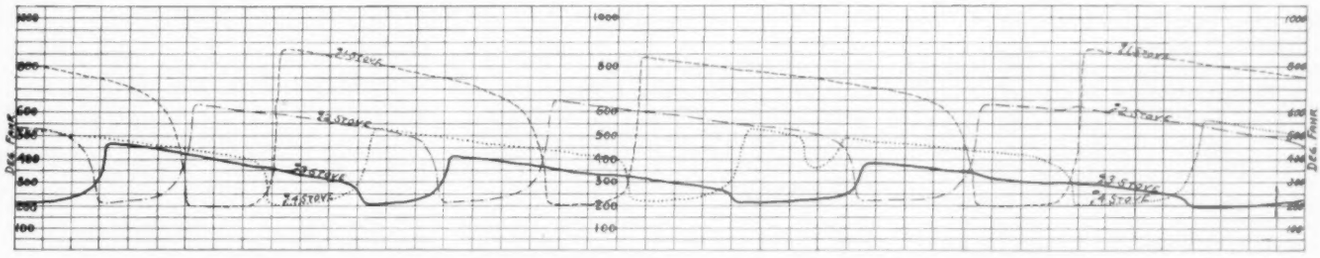


THE BAILEY WELDED SHELL DESIGN.

HEMISPHERIC DOME—Provides method of building brick shell wall independent of dome brick.

TELESCOPIC SHELL DESIGN—Provides method of increasing thickness of insulation in hot zones of stove without interfering with standard brick shell wall thickness.



STACK TEMPERATURE CHART ON BLAST FURNACE STOVES

Four stoves of same size burning same quantity of primary cleaned gas.

No. 3 Stove has 3" Open Joint Checkers; other stoves straight flue checkers. Note difference in maximum and average stack temperature.

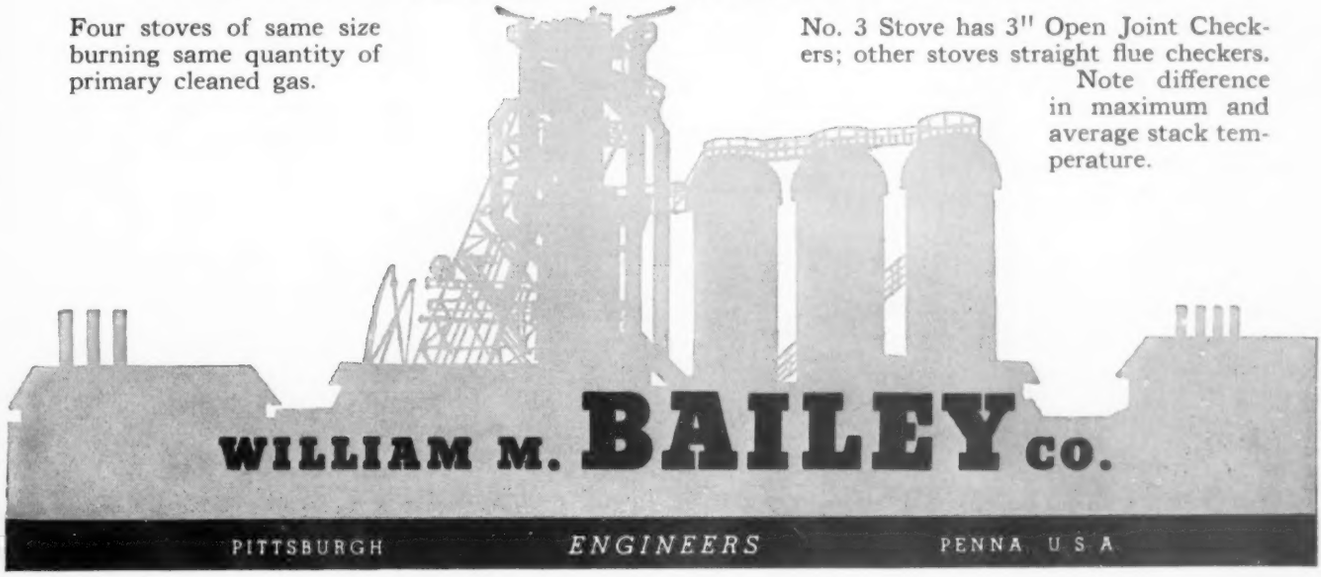


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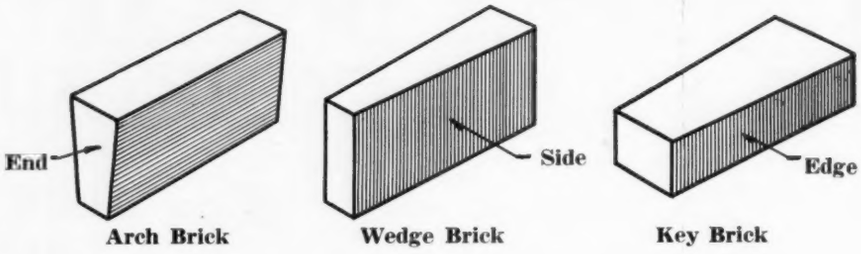
Fig. 4—Various types of brick for furnace arch construction



ry units known as "skewbacks," provided with sloping faces from which the arch rises, or "springs." In arches of the type discussed here the "spring-lines" are the lines of contact between interior surface of the arch and sloping faces of the skewbacks.

An arch exerts upon its abutments not only the downward force of its own weight and the weight of any loads carried by it, but also an outward or horizontal force, which tends to make it spread. In furnace construction, the vertical component of the arch stress is either supported by the furnace wall, or it is carried by iron or steel beams. The horizontal component of the arch stress also must be resisted, else the skewbacks will slide outward and deprive the arch of its support. This outward thrust must be sustained adequately by abutments and buttresses. In the case of a roof arch, horizontal thrust is transmitted through the skewbacks to a steel supporting system known as the furnace "binding." In the case of flues, outward arch thrust is resisted by metal binding, or by a metal or concrete casing. In the case of arches which span wall openings, the outward force is supported by resistances within the wall itself.

Roof Arches

In furnace construction, roofs of the type most commonly employed consist of segmental sprung arches formed by combinations of refractory brick shapes. The arch rests at both ends against brick skewbacks which transmit the arch stresses to the furnace binding. This consists of horizontal "buttress" beams placed lengthwise of the furnace directly back of the skewbacks; vertical beams known as "buckstays," anchored at their lower ends and spaced at intervals along the furnace walls; and horizontal members or "tie-rods" extending across the furnace above the roof, and connecting the upper ends of opposite buckstays. The stability of the arch depends upon its rise and thickness, the material of which it is composed, and upon the strength, placement and structural support of the skewbacks. The following discussion is limited to the simple segmental arch in which both the inner chord and the spring-lines are horizontal.

Features Are Named

In Fig. 1, a typical sprung arch is illustrated. The sloping surface of a skewback brick is termed its "face." Deviation of the face from a vertical plane is known as the "slope" of the skewback. The "rise" of an arch is the distance between the inner chord and the inner surface of the arch at their centers.

Usually, in the design of a furnace arch, the span and the thickness are established first. When, in addition, a decision is reached regarding the rise of the arch, or the rise per foot of span, it is possible to calculate all the other arch dimensions, as well as the slope of the skewback.

Rise of an arch may be expressed either in inches per foot of span, or in terms of its central or included angle. When either the rise per foot of span or the central angle is known, the other is definitely fixed. For example, an arch with a rise of 1½ inches per foot of span always has a central angle of 56 degrees 8.7 minutes regardless of the length of the span. The inside radius of an arch depends upon the span, as well as upon the rise. When the span and rise are known, both the inside radius and the central angle are definitely fixed.

In designing a sprung arch for a furnace roof, careful attention should be given to the amount of rise. If a roof is too flat, it will be unstable and will produce excessive stresses on skewbacks and buckstays. If it is too steep, the roof will tend to buckle outward at points approximately half-way between the topmost point of the arch and the skewback. Consequently, a roof arch should have a rise of not less than about 1 inch nor more than about 3 inches per foot of span.

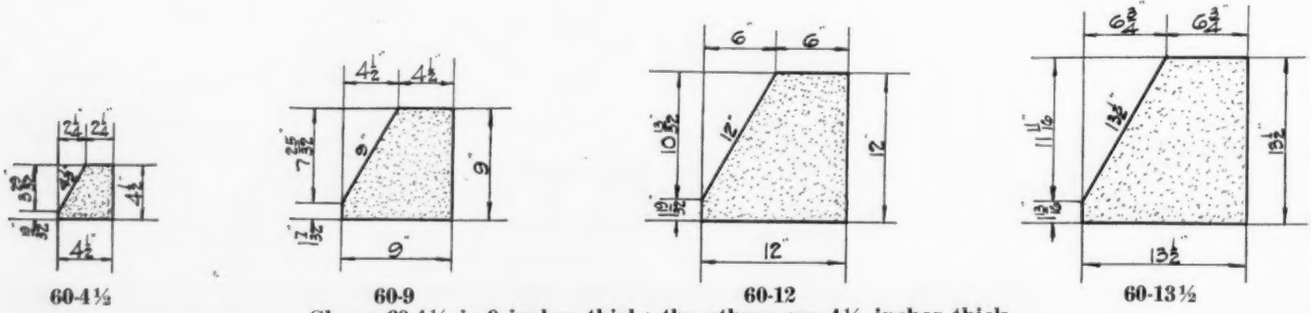
A roof built of fireclay brick will usually be given a rise of not less than 1½ inches nor more than 3 inches per foot of span. The higher figure is recommended for roofs which are subjected to unusually high temperatures or to conditions of soaking heat. Silica brick roofs may have a somewhat lower rise than fireclay brick roofs, on account of their greater strength at high temperatures.

Insulating refractory brick have much lower resistance to compression than do fireclay or silica brick; roofs built of insulating refractory brick should be given a rise of not less than 2 inches per foot of span.

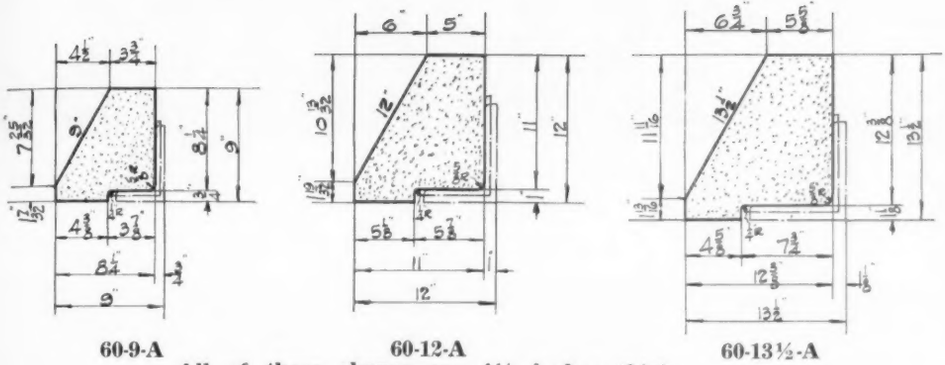
Arches Not Standardized

Up to the present time, there has been no standardization of roof design. Conditions in different furnaces vary to such an extent that no single ratio of rise to span can be adopted for all roofs. In order to provide the desired volume for combustion or for other reasons, it is sometimes necessary to give the roof arch a relatively high rise; in other cases, a low rise is preferable. In many copper reverberatory furnaces, for example, the rise is limited by operating requirements to about 1 inch per foot of span. How-

Fig. 5—Standard 60-degree skewbacks



Shape 60-4½ is 9 inches thick; the others are 4½ inches thick



60-9-A 60-12-A 60-13½-A

All of these shapes are 4½ inches thick

Skewback brick with angle cutouts shown are suitable for various angles of maximum sizes shown in the following table:

Shape	Maximum Size of Shorter Leg	Maximum Thickness
60- 9-A	4″	¾″
60-12-A	6″	1″
60-13½-A	8″	1⅛″

Fig. 6—Skewback brick with cutouts for steel angle supporting framework

ever, a relatively small number of ratios of rise to span can be made to serve in practically all cases, since small deviations from these are of little consequence.

A logical standard for many applications is the arch with a central angle of 60 degrees, corresponding to a rise of 1.608 (about 1-19/32) inches per foot of span. This 60-degree arch meets all the normal requirements for strength and stability. Incidentally, in calculating brick for such arches, results are obtained more easily and quickly, since the inside radius is equal to the span and the arch includes exactly 1/6 of a circle.

A rise of 1½ inches per foot is obtained when the skewback is built with standard 9-inch feather-edge brick of the 2½-inch series, as shown in Fig. 2. A rise of 2.302 (about 2-5/16 inches per foot of span) is obtained when standard 9-inch sideskew and endskew brick of the 2½-inch series are used as shown in Fig. 3.

In general, the thickness of an arch should be not less than 4½ inches for spans up to 5 feet; 9 inches for spans between 5 and 12 feet; and 12 or 13½ inches for spans over 12 feet. Roof arches which are relatively flat, insulated, or subjected to extremely high temperatures or to severe corrosive action should be thicker for a given span. Other factors which influence the thickness are the strength of the brick, type of service, and normal life of the roof.

Use of Brick

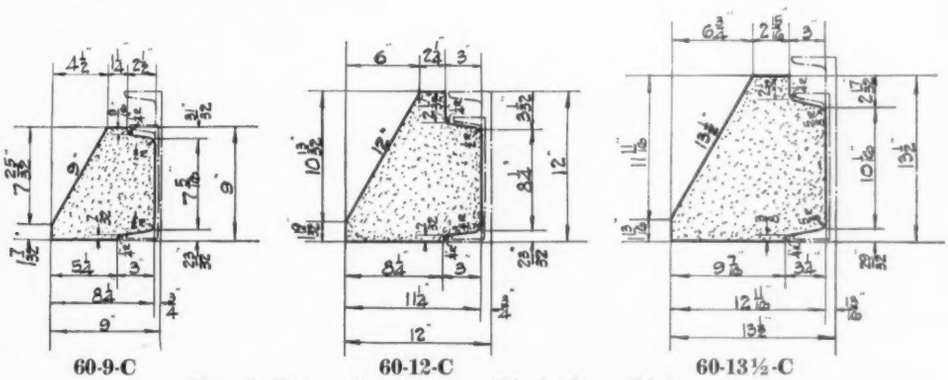
Furnace arches are formed by tapered or radial brick, used either alone or in combination with other brick of rectangular section known as straights. The tapered brick employed are standard or special shapes known as wedge, arch and key brick. Any confusion regarding the distinction between these can be avoided by referring to Fig. 4 and recalling a few simple facts: An arch built of arch brick has a thickness equal to the *width* of the brick, while one built of wedge or key brick has a thickness equal to their *length*. In an arch, a course of wedge brick is laid with the *sides* of the brick in contact, while a course of key brick is laid with the *edges* of the brick in contact.

Wedge brick and sometimes key brick are used for wide spans; wedge brick or arch brick for narrow spans. At times it is possible to build an arch with units which are all of the same size and shape. This is true when the radius of the arch is the same as that of a ring formed by an individual radial brick. Usually, however, in order to obtain the desired radius for an arch with standard brick sizes, it is necessary to use a combination of radial and straight brick, or of two radial brick having different tapers. When the proportion of straight brick in an arch is too high, the arch cannot be properly keyed, and therefore lacks stability. Where practical, the number of straights should not be greater than twice the number of radial brick. In arches having relatively wide spans, a much more desirable ratio of radial to straight brick is obtained with sizes of the standard 3-inch series than with those of the 2½-inch series.

Importance of avoiding an excessive proportion of straight brick in an arch is illustrated by the following experience. In a certain plant in which heating furnaces are operated at a temperature of 2600-2700 degrees Fahr., furnace roofs have a span of 12 feet, and are built with standard 9-inch sizes. Originally the roofs had a rise of 1½ inches per foot of span, or a total of 18 inches, and were built with brick of the 2½-inch series. For each course, 50 straights and 14 No. 1 wedge brick were required; that is, 3.57 straights to each wedge brick.

Expansion that results from heating caused the straights to slip along the radial joints, with resultant exposure of corners and joints to flame action. In redesigning the

Fig. 7—Skewback brick with cutouts for steel channel framework



60-9-C 60-12-C 60-13½-C

All of these shapes are 4½ inches thick

Skewback brick with channel cutouts shown are suitable for various channels of maximum sizes shown in the following table:

Shape	Max. Channel Size	Max. Flange Width	Max. Web Thick.
60- 9-C	12″	3-13/32″	¾″
60-12-C	12″	3-13/32″	¾″
60-13½-C	15″	3-13/16″	13/16

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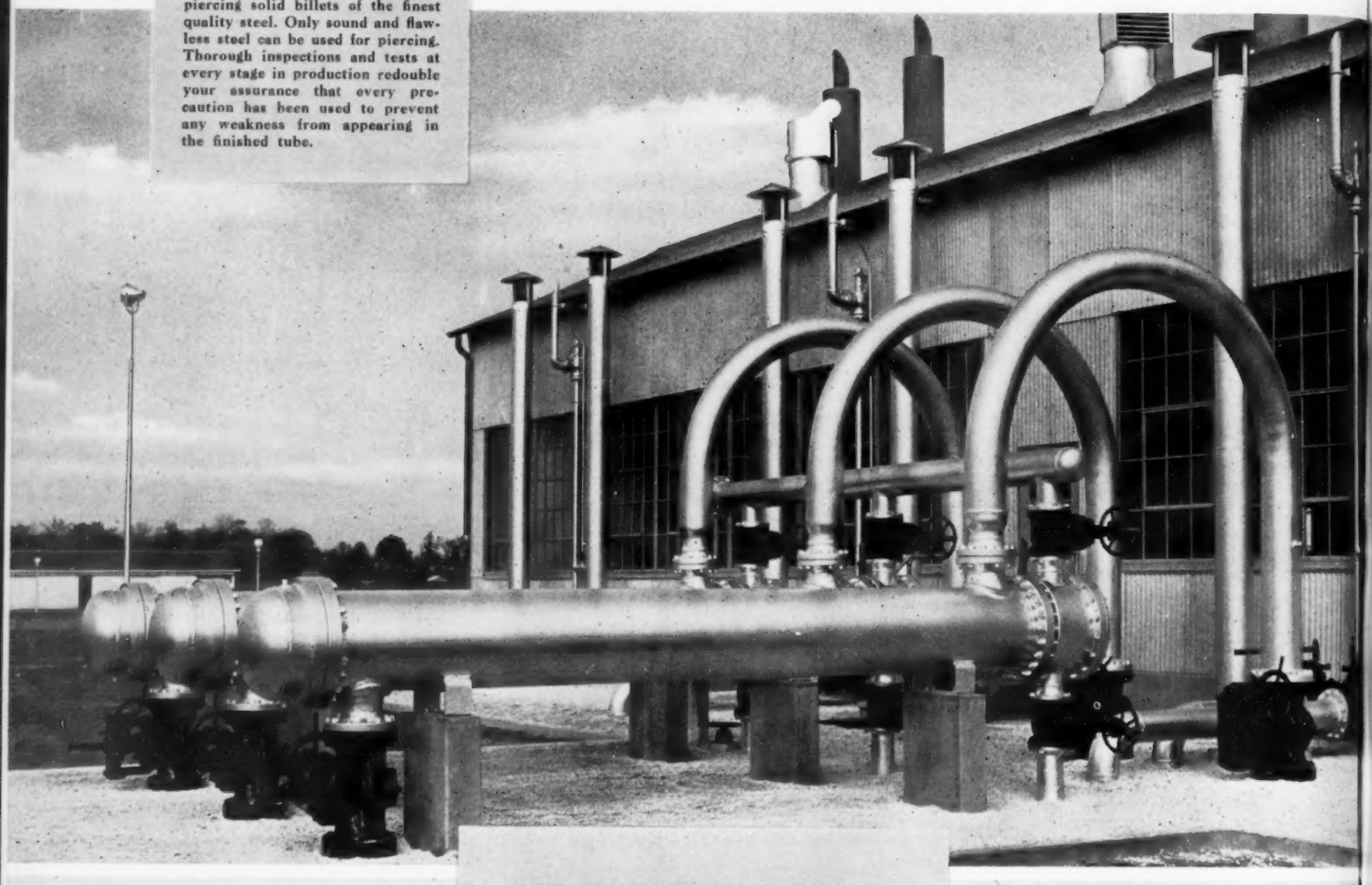

THESE GAS DISCHARGE MANIFOLDS *in the new compressor station of a prominent Natural Gas Company required pipe that would withstand bending and still operate safely at high pressures. Naturally the choice went to* NATIONAL *Seamless Pipe.*

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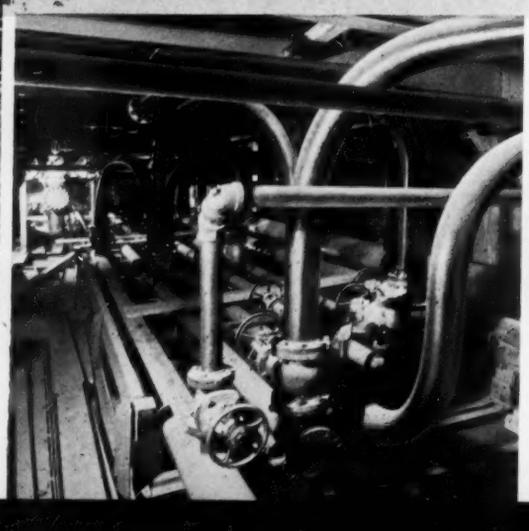
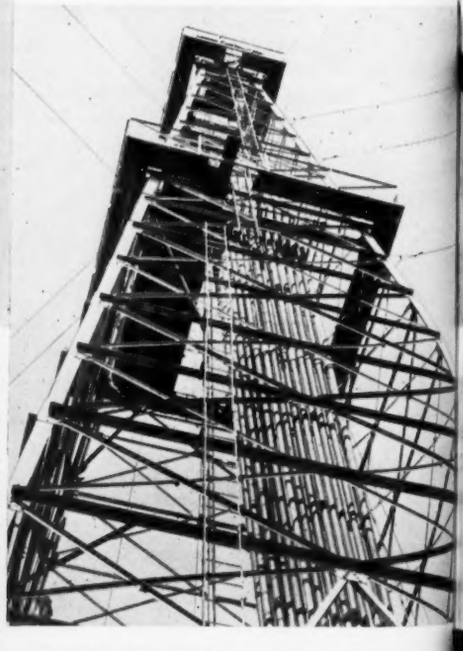
POWER PLANTS *are now being designed for higher and higher pressures. Experienced engineers and specification writers unhesitatingly place seamless at the top of the list of acceptable materials; in fact, for severe or hazardous service, the use of seamless is frequently mandatory.*

FOR OIL, GAS, AND GASOLINE LINES, NATIONAL *Seamless is widely accepted as the finest available pipe. A cross-section of the country's outstanding modern pipe lines shows predominant use of* NATIONAL *Seamless. Here is the final link of the line serving Detroit with natural gas from the Texas fields, a 230-mile line of 22-inch* NATIONAL *Seamless.*





IN THE OIL FIELDS *spectacular advances have been made in deep drilling; wells now extending more than two miles down. A large share of the credit goes to* NATIONAL *Seamless Drill Pipe because it withstands the racking strains encountered.* NATIONAL *Seamless Casing and Tubing have also contributed materially to profitable oil production.*

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Among all methods for making pipe and tubes, the Seamless Process is unique in that it offers dependability in the highest degree. Only seamless gives you the complete security of uniform wall strength, because only seamless has no weld — no long line of potential weakness.

Industrial men now realize that NATIONAL Seamless supplies the answer to hundreds of difficult problems, and they apply it wherever maximum dependability in pipe service is essential. In power plants for safer handling of high-pressure steam; in pipe lines transmitting oil, gas, and water at high pressures; in vital parts of automobiles, aircraft, and industrial machinery; in deeper oil-well drilling; in fact, today, throughout all industry, the superiority of seamless is a matter of record.

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arch to eliminate as many straights as possible, the rise was made 2¼ inches per foot of span, and standard brick of the 3-inch series were adopted. Under these conditions, 1 straight and 52 No. 1 wedge brick are required per course of arch. Difficulties previously experienced were overcome, and roof life is approximately double that formerly obtained.

Straight Brick Eliminated

In this instance, straight brick were eliminated almost entirely from the final design. However, it is usually unnecessary to go that far, in order to secure satisfactory arch life. In numerous cases, satisfactory service is obtained from arches which are built with two straights to each wedge brick.

Arches formed of separate courses or rings, not tied together, are called "ring arches"; those in which the joints are offset, or staggered, to tie the entire construction together are known as "bonded arches."

Skewbacks may be built-up combinations of standard brick sizes, or they may be one-piece special shapes. An advantage of the built-up skewback results from the fact that sizes used in its construction are available as needed from stocks regularly carried by the manufacturer. These skewbacks can be used satisfactorily for roofs of small spans. Built-up skewbacks are illustrated in Figs. 2 and 3.

One-Piece Skew Preferable

The one-piece skewback is stronger because of its freedom from joints and because it can be supported more completely by the metal buttress. It is generally to be recommended for furnace arches having spans greater than 4 feet. It should be strong and rugged and of good workmanship. Its surfaces should be smooth, especially its face, the surface from which the arch springs. It is important that the face be given the proper slope, as determined by the rise and the span of the arch. When the skewback is carried on a channel or an angle, it should be designed and placed so that the line of thrust will pass through or slightly above the corner of the supporting channel or angle. The face of a one-piece skewback should not intersect the base at an acute angle, with the formation of a featheredge which may crack or shear off. It is better practice to provide the skewback with a square toe, as shown in Figs 5, 6 and 7.

In most cases, the dimension of a skewback brick lengthwise of the wall upon which it rests may advantageously be 9 inches for 4½-inch roofs, and 3 to 4½ inches for 9, 12 and 13½-inch roofs.

The slope of the skewback, or angle between its face and a vertical plane, is equal to one half the central angle of the arch. Since there has been no standardization of arch or skewback design, it follows that skewbacks of individual slope are used in many furnaces. It is often necessary to provide a "cut-out" in the skewback shape, so that it will fit the angle or channel used as a buttress. Since the angles and channels used for this purpose vary in size, the cut-outs in the brick likewise vary in dimensions.

In plants where it is possible to standardize on one central angle for the roofs of all furnaces, there will be no necessity for carrying in stock skewback shapes other than those which fit the central angle selected. The advantages of arches having a central angle of 60 degrees have already been mentioned. Skewbacks for such 60-degree arches are shown in Figs. 5, 6 and 7. Fig. 5 represents a series of skewbacks without cut-outs; Fig. 6, a series with cut-outs to fit angles; and Fig. 7, a series with cut-outs to fit channels. From the illustrations, skewbacks can be selected for arches 4½, 9, 12 and 13½ inches thick.

Suitable As End Supports

Skewbacks of the design shown in Fig. 5 are suitable as end supports for arches over openings in walls and for arches of flues set in steel or concrete casings. They may be used also for roof arches when the supporting angle or channel can be placed with its flange outward, or when a buttress block of brick separates the skewback brick from the metal buttress. The shape shown in Fig. 5 as No. 60-4½ may be used for roofs 4½ inches thick, even when the skewback brick is in contact with a steel angle placed with its flange inward, since with small skewback brick of this size the metal buttresses are not set into the brick but are fitted around them.

Cut-outs in the skewback brick illustrated in Figs. 6 and 7, are designed to fit the heaviest angles and channels likely to be used. When thinner angles are employed, proper bedding of the skewback brick should be secured by the use of brick or mortar material. It is sometimes desirable to provide an air space under the angle or channel, to permit air-cooling.

(To be concluded in an early issue)

Deliveryman's Dream

■ **Styled to increase the drivers comfort and facilitate rapid egress and ingress, this streamlined delivery truck is attracting much attention in the automotive field. It was designed by Wilbur Henry Adams, Cleveland, for Divco-Twin Truck Co., Detroit. Body provides for the utilization of all loading space with increased space in the front. Truck has a lower through aisle with the operating pedal far enough forward to clear the aisle and steering gear similarly out of the way**

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Vibration and Noise Now Trailed to Source

■ EMPHASIS recently placed upon noise reduction in many lines of work has accelerated study of methods for trailing down the source of noise in machinery and equipment. Once the source is found, its removal is usually not costly or complicated and quite often is accompanied by significant increases in efficiency and life of the equipment.

Recent introduction of highly developed sound level and vibration testing equipment has enabled manufacturers of heavy machinery to make large reductions in noise and vibration formerly considered inseparable with the machine's operation. Such equipment as aircraft motors, automobiles, marine diesels, turbines, lathes and machine tools of all types constitutes a fertile field for vibration and noise studies. Early recognizing the importance of this factor, automobile and aircraft manufacturers were perhaps the first to make sound studies of their products with the result that quiet operation has become one of their strongest selling points.

Microphone Sensitive Element

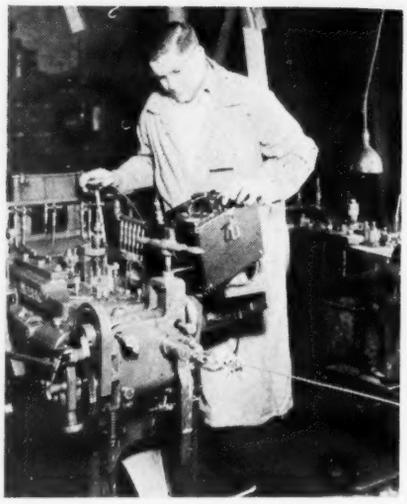
There are a number of different types of sound analyses. A sound level meter utilizing a microphone as the sensitive element gives readings for various locations or when used at one location gives comparative sound intensity values so that various equipment can be compared. Used in acoustically dead rooms where walls and ceilings have low sound reflection factors, new designs can be studied and compared with old to aid in elimination of noise.

Readings Are Accurate

Complimentary equipment used with the sound level meter utilizes a piezo-electric crystal as the sensitive element. With this, vibration amplitude readings are obtained. Such readings are independent of surrounding noise level and so can be accurately obtained and used without necessity of constructing special soundproof rooms. Since this vibration pickup localizes the measurement to one point it becomes possible to measure vibration at bearings, cylinders, gears, etc. and from these localized tests a complete vibration pattern of any machine can be obtained. With this information, points of maximum strain and noise can be traced and located accurately.

However, locating the point at which the noise originates may not give the clue to what is causing it because every part in a machine has a certain mass and period of vibration resulting in occurrence of resonant vibrations. The causes of these resonant vibrations cannot be located by a simple vibration amplitude analysis.

To cope with this problem, industrial engineers have found it desirable to determine both the amplitude and the frequency of each component of the complex vibration. This requires that the output of the vibration amplitude meter be fed into a wave or frequency analyzer, long used in electrical work and often known as a harmonic analyzer. This instrument separates the various components of the noise or vibration and measures the strength and frequency of each. It is particularly useful in analyzing machinery noises and vibrations because these generally have a fairly regular harmonic pattern.



Locating source of vibration in a machine with sound-level meter and vibration pickup

With this complete frequency and amplitude information, and knowing the speeds of the various parts of the machinery, the engineer is equipped with the necessary information for locating the ultimate source of the undesirable frequency and hence for bringing about its elimination.

Three Stages of Study

Thus the study resolves itself into three stages, determining the source of the noise, method of transmission and manner in which the objectionable noise is excited.

Engineers of General Radio Co., Cambridge, Mass., maker of sound level measuring equipment, recently made an interesting sound study in the plant of a manufacturer employing a large number of machine tools in a multi-story building. Resonance in the wood floors produced excessive noise levels. A study was made in an effort to reduce them. A vibration pickup was employed to obtain a large number of readings at different points on the floor. These were plotted to show contour lines for constant vibration amplitudes and indicated sources of noise which subsequently were insulated from the floor with the result that noise was reduced to a satisfactory level with little expense.

Similarly, the pickup unit can be moved over walls, ceilings and parts of machines and contour lines plotted for constant amplitudes to

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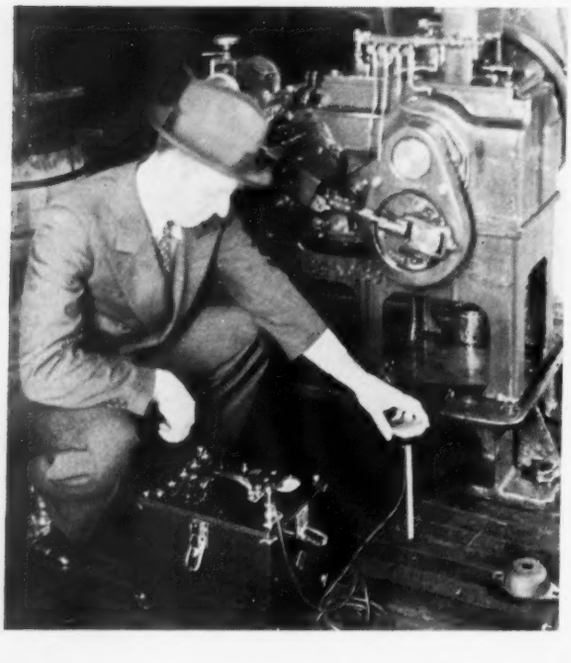

Sound-level meter and vibration pickup tracing down floor vibration. Photo courtesy New England Screw Co.

Production Executives' Conference Deals with Personnel and Wages

■ WAGE AND HOUR reduction matters commanded major attention at the twelfth annual production conference of the American Management association, held at Hotel William Penn, Pittsburgh, April 20-21.

About 600 attended the sessions and entered into discussions of management problems. A high spot of the sessions was a closed meeting in the form of a dinner and smoker during which important problems confronting the production executives under conditions prevailing today were discussed in an open forum.

At the regular sessions, the subjects under discussion included the "human element" in production, latest developments in training employes, gearing operations to quick changes in the economic picture such as occurred in the closing months of 1937, and wage payment methods. Abstracts of the various papers follow:

Stabilizing Employment And Annual Wages

By Harold B. Bergen, McKinsey, Wellington & Co., New York

■ Unemployment is our greatest labor problem. Management, organized labor, and government have taken steps to solve it. The more effective management is in reducing unemployment, the less active other agencies will become in the problem.

Attention is directed at this time at annual wage plans. These plans are facilitated by better employment stabilization. Steps to be taken by management include the following:

1. Develop better budgetary control, including co-ordination of sales, warehousing, and production.

2. Improve sales management, including market research, sales analysis, economic forecasting, and sales estimating.

3. Improve production control, including production scheduling, coordination of technical research with employment stabilization, and planning of repair and maintenance for slack periods.

4. Develop better methods of personnel management.

By budgetary control it should be possible to co-ordinate sales and production, and to make only what can be sold. Basis of employment stabilization is good sales forecasting. Accurate sales estimating depends upon market research, sales analysis, and economic forecasting. Market research should indicate possible new uses of products during slack periods, also new products to be sold in off seasons. Simplification of lines may promote employment stabilization.

Determining Labor Needed

Increased advertising and sales programs during cyclical unemployment may help stabilize demand for products. If it has been possible to forecast a minimum volume of sales for the year, it should be reasonably easy to determine the factory force to produce this quantity.

Establishment of so-called permanent force to take care of the minimum production scheduled should make possible development of an annual wage plan. The minimum force required may be placed on a straight salary basis and the additional so-called temporary employes on an hourly basis. If it is not possible to avoid seasonal peaks in the minimum production scheduled, an agreement should be made with permanent employes to provide that certain maximum hours may be worked without overtime for a limited number of weeks during the busy season and shorter hours during slack periods. Annual earnings can be estimated and divided into 52 weeks of equal payments, including vacations.

Technological changes should be anticipated and the adjustments of employes to be displaced planned on a long-range basis.

Development of these devices should be undertaken only with cooperation of employes through their chosen representatives. Stabilization policies and techniques should be thoroughly understood by and acceptable to employes before they are adopted by the management.

Advance Danger Signals

By E. C. Bratt, assistant professor of economics, college of business administration, Lehigh university, Bethlehem, Pa.

■ Emphasis on business barometers now available shows a definite trend, even under the unusual economic conditions of the present recession. For example, bond prices usually form a good indicator inasmuch as they tend to firm early in a depression when money is being placed in the bond market. Stock prices also are an aid, although not so reliable as they tend to be influenced by a number of factors.

Self-reinforcing and self-limiting factors are important influences in indicating the business trend. The terminus of any business movement occurs when these two sets of factors reach a balance. The recovery of 1936-37 was unsound because capital goods production did not get well started. This phase of production was retarded by three factors; namely, abnormally high wages which made hiring of the less efficient men impossible; high wages paid by government agencies made the lower bracketed workmen inefficient; and constant governmental reforms and interference made business jittery and caused lack of confidence.

Two potent factors which today are tending to swing the pendulum toward recovery are: Need for durable goods, and accumulation of savings which needs to be invested. These factors will exert a good deal of influence on the economic picture as they grow.

Need for business forecasting is more in the long range forecasting division and not so much a month to month viewpoint. Forecasting major turns is far more important

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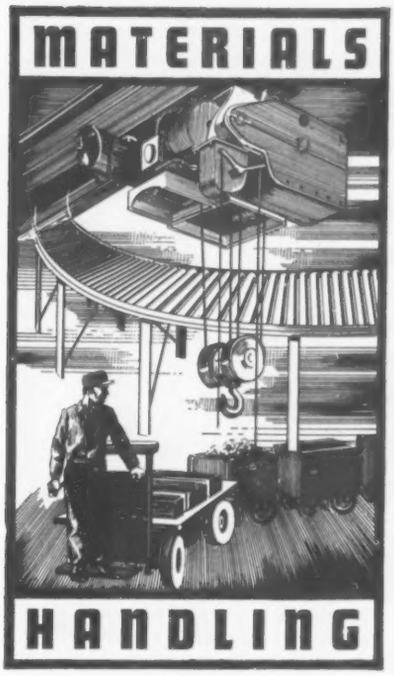

Mold Conveying

Saving of 12½ per cent in operating costs and 44 per cent increase in tonnage daily reported since installation of a new twin system handling 2½-ton ingots to shakeout

J. A. CRONIN, Materials Handling Editor

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■ IT IS RECOGNIZED that handling in foundries generally involves the movements of larger tonnages of raw materials and supplies in proportion to finished products than is true in other departments of manufacturing plants.

For instance, where one ton of finished steel is said to require approximately six tons of raw materials, it has been stated in one text book at least that "depending on the type of foundry, the tonnage of material moved per ton of finished product might possibly be as 70 to 1 in a foundry of automobile parts, as 140 to 1 in a sanitary ware foundry for each ton of castings delivered to the shipping platform."

Handling Cost Minimized

Because it is a problem of major importance, it is natural that great progress has been made in the adoption of mechanical handling methods to minimize foundry handling costs. An indication of the results which often accrue from modernization in this direction is the case of a manufacturer of railroad and automotive devices who recently installed a conveying system. A comparison of the old and new methods reveals a 12½ per cent saving in operating costs and a 44 per cent increase in tonnage handled daily. For example, it is reported reliably that it has been possible with the new system to increase the number of molds handled per hour from 28 to 40, or from 224 to 320 in an 8-hour day.

This installation was designed to provide a more efficient method for making, handling, pouring and cooling of molds from drag and cope machines to shakeout. The molds were 57 inches long by 30 inches wide, with a maximum total weight of 5000 pounds. The complete installation as now used comprises twin systems, including conveyors, roll-over drag machines, cope machines, storage lines for pouring and cooling and shakeout stations.

Each duplicate system consists of two lines of conveyors. The line to pouring and shakeout comprises two power-operated, pallet-type conveyors.

One is set level and receives the mold from the drag machine. This is offset in a horizontal plane to permit floor space about cope machine operators, as shown in Fig. 2.

The second conveyor of this same type delivers cooled molds to the shakeout, and is level, inclined, and level. The inclined portion is set at approximately five degrees incline to secure the required elevation necessary to reach the shake-

Fig. 1—View of portion of one of the twin conveyor systems, showing level pallet conveyor which incorporates a short section of live rollers Photos courtesy Mathews Conveyer Co. Ellwood City, Pa.

Fig. 2—This conveyor line is offset in a horizontal plane to permit sufficient floor space about cope machine operators

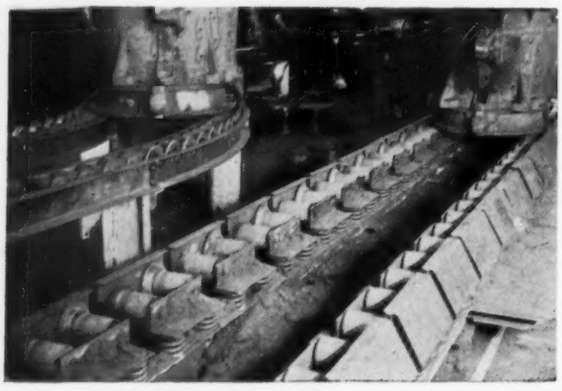

Fig. 3—Molds weighing 5000 pounds handled on spring-mounted roller conveyor with steel guard plates to protect against molten metal

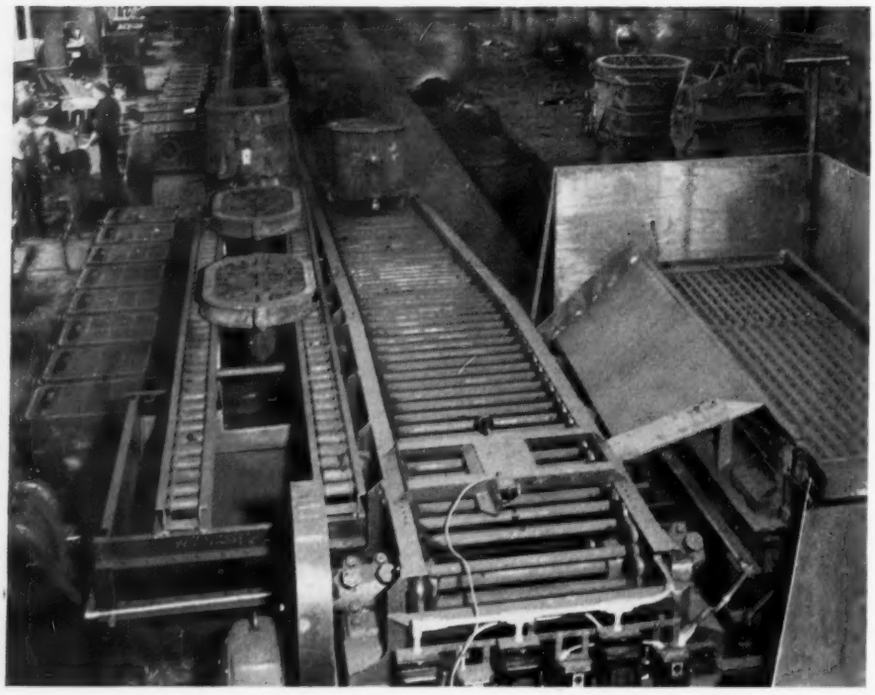

Fig. 4—Molds proceed to shakeout over inclined pallet type conveyor. This view also shows the beginning of the flask return line

out station and flask return line, as shown in Fig. 4.

In the first of these pallet-type conveyors, serving the drag machine, is incorporated a short section approximately five feet long made up of live rollers mounted on chain attachments. This feature permits holding a mold prior to entering the heater, which is used for dehydrating. The live rollers revolve underneath the riding surface of the drag, since both the offset receive and discharge sections of this level conveyor are driven with one main drive. (See Fig. 1). The flask return line serves to supply drag plates to roll-over drag machine, and cope flasks to cope machines.

Conveyors Spring-Mounted

As operations continue, the molds are delivered to the discharge end of the pallet conveyor where the mold is closed, as shown in Fig. 5. From this point, the complete mold, which is now ready for pouring, continues to pouring storage on heavy-duty, flanged roller conveyors which are spring-mounted.

This permits handling of these 5000-pound molds without damaging overloads and impacts beyond the rated capacity of the individual rollers and bearings, and is said to result in a minimum of bearing failure.

In Fig. 3 may be noted the roller conveyor construction with the springs underneath. This also illustrates the use of steel guard plates on the outside of the conveyor for preventing molten metal from damaging bearings, rollers and axles.

Molds are stored, poured and cooled on this line of conveyors, and from there they proceed to shakeout station over the second and inclined pallet-type conveyor. This is shown in Fig. 4, which also shows the beginning of the flask return line which is made up of two parallel lines of ball-bearing rollers, set at close centers. Both portions of the flask are returned on this conveyor by gravity. In Fig. 5 flasks being returned are shown approaching the cope and drag machines.

Accompanying illustrations show one of the two, or twin, systems. It

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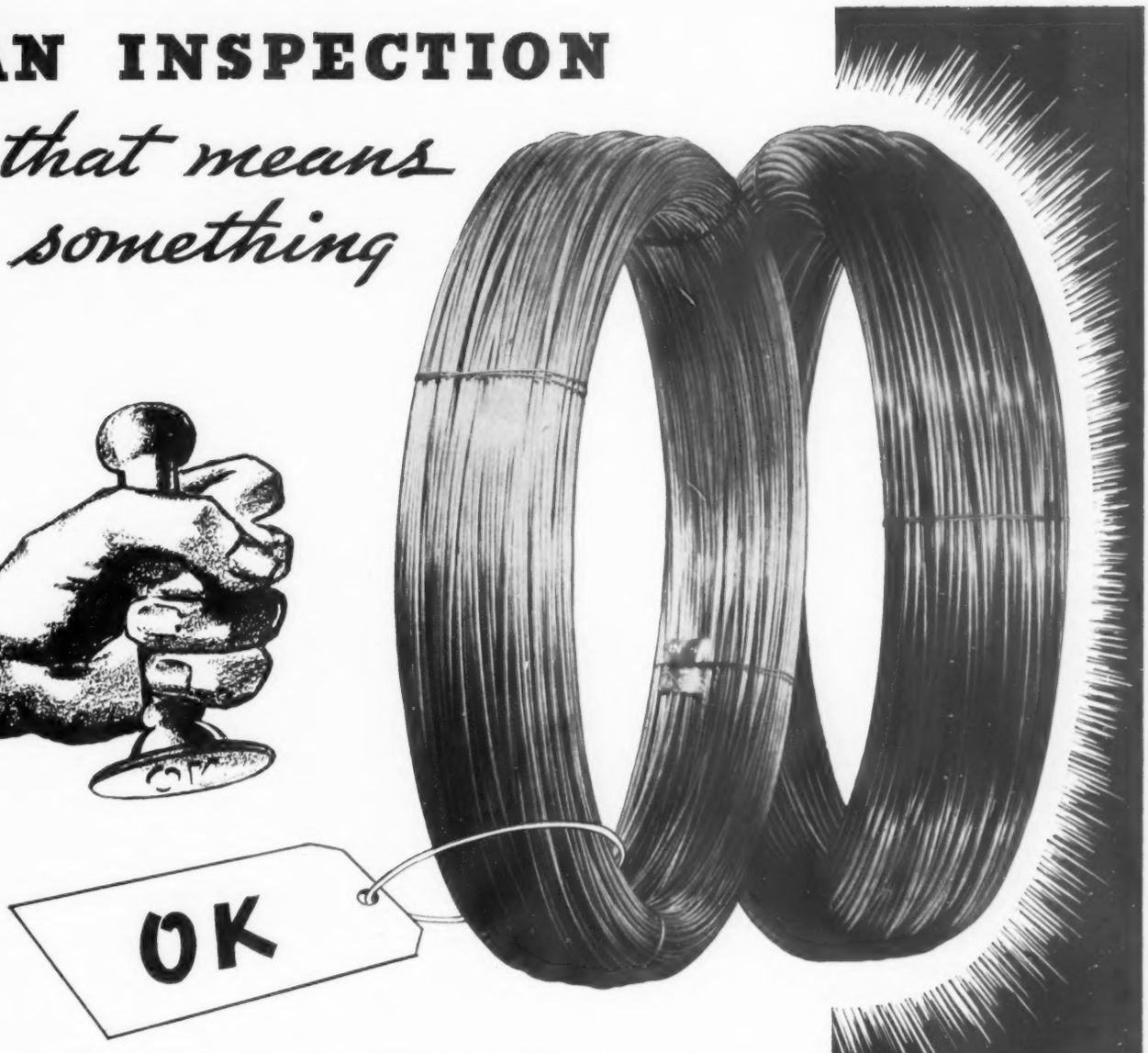
AN INSPECTION

that means something



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Wire • Bolt Wire • Tack
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Pittsburgh Wires

FOR EVERY PURPOSE

Advance Danger Signals

(*Concluded from Page* 55)

because it enables executives to lay sounder plans for the future; the close range picture, while helpful to sales heads, does not enable the planning of a long term program.

Forecasting . . Planning

By B. H. Lytle, manager, small motor division, feeder division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

■ The practices outlined have helped considerably in softening the blow resulting from the sudden drop in general business. The primary aid in production planning is forecasting. Forecasting must start in the sales department as salesmen know plans of their customers and their problematical purchases. In addition to information gathered from customers there must be a knowledge or estimate of general business trends.

Our company economist continuously studies markets and conditions which directly or indirectly affect our business. His views interpret future business trends and are important in their tempering effect on forecasts made by the sales department.

The long-term forecast is based on an average of total business forecasts presented by district sales managers, division plant managers and other executives. This brings together estimates of about 50 people, the average giving a good indication of future trends.

Sales department every month forecasts prospective total business for the succeeding 1, 3, 6 and 12-month periods. These are compiled on a dollar basis and are segregated as to industries. From these the anticipated load for each plant is obtained. Experience has given a basis for breaking down the dollars worth of business into factory components; namely, labor and raw materials. Standard raw materials such as steel, copper and insulation amount to about 25 per cent of each dollar's worth of business. Each plant knows from experience the man-hours required per dollar billing and the forecast therefore indicates future labor requirements.

The forecast must be broken down to requirements of plant units and, in many cases, segregated within that unit due to the varieties of our products and the fact that the majority are made to customers' orders and cannot be stocked.

Assembly divisions give each month to the feeder division in chart form the existing load of unfilled orders broken down to types of apparatus. The feeder division at the same time gives assembly divisions a picture of loads in various departments; such as foundries, metal stamping, copper mill, screw machine, etc. At a monthly meeting of production supervisors these load charts are discussed and necessary action taken.

The feeder division is now supplied with all the available information dealing with the demands which will be made on its production capacity. It is realized that this information is not 100 per cent correct, but it is sufficiently accurate to be used as a guide in planning.

Junior Executives

By Charles P. McCormick, president, McCormick & Co., Baltimore

■ No man has ability to run a sizable business on a one-man basis. He should have the help of every individual in the management. The speaker told how he has made use of the abilities and ideas of his four-board system which he calls "multiple management." This consists in the organization of minor boards which supplement the senior board of directors. In his company there are three such boards: Junior executive board; factory executives board; and sales board. Each one consists of about 15 members. The Junior executive board is recruited from all administrative departments, but the factory and sales boards' members come only from those respective departments.

"This plan of 'multiple management' offers a common ground for complete understanding between employer and employes by harmonizing their interests. From the first, it was determined to devise a plan of management which would concentrate the attention of the whole organization upon developing the business. Through 'multiple management' this aim has been achieved and the entire organization has become stronger and more dynamic. It has helped to uncover promising young men of talent, and it helps to educate them towards the capacity for developing the business."

Mr. McCormick said the plan had been in operation since 1932. "Under this system, active management is carried on through united effort of executives instead of a few executive officers. All four boards meet separately at stated intervals to act upon their individual problems, and plans passed unanimously by the junior and factory boards are submitted to the senior board for final approval. Elections to the junior and factory boards are held semiannually.

"Employes may submit to the proper board questions pertaining to management, working conditions, hours, and wages in their departments. Any person dismissed may appeal his case before the factory or junior board.

"Experience under 'multiple management' provides emphasis for the statement that the most difficult management problems of the future will relate to the human factor.

"It is our belief that the purpose of industry is not only to make money but to fulfill its obligation to the workers.

"Primary purpose of the management of the future will be to build men. It will place the human factor above profit, knowing that if the human factor is right, profit will take care of itself."

Employe Attitudes

By J. J. Evans Jr., personnel manager, Armstrong Cork Products Co., Lancaster, Pa.

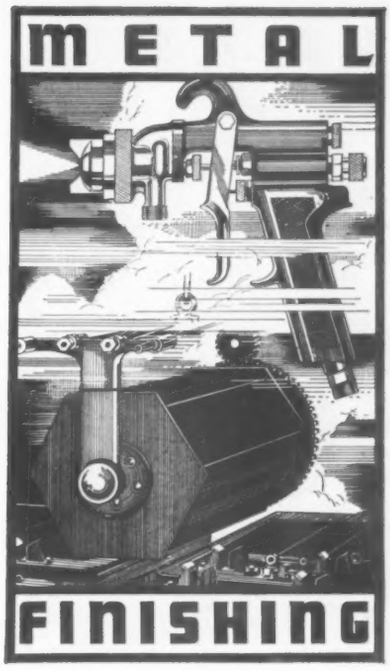
■ Every company should have up-to-the-minute information about what the workers really think so that a sound labor policy may be established and maintained. To obtain such information, the Armstrong company issued a booklet in which the employes could fully express themselves.

"The personnel department came to the conclusion that each employe wants at least seven things from his job: (1) Security of job and income; (2) a fair wage for work performed; (3) safe, orderly work places; (4) pride in the policies, products, and progress of his company; (5) reasonable working hours affording time for relaxation; (6) knowledge of what the company is doing and a chance to express his opinion freely; (7) opportunity to be prepared in the event of sickness, accident, or death, and to provide an income for his declining years.

"The idea of the booklet questionnaire was that each one of these seven things should be taken apart in detail so that the worker could see what the company was doing about each one. Every employe of the organization from the president to the office boy received one of the questionnaire booklets and was asked to check his answers to specific questions, and to comment on each one of the subjects.

"It was emphasized that no employe who criticized something he did not like would be checked up. Thus no signature was requested and no place was provided for one.

"Exactly 7181 of these booklets were distributed by the company. One out of every seven persons replied. More than 82 per cent of these returns contained pertinent comment on the questions covered in the questionnaire."



Corrosion

Protection of metals against corrosion is subject of symposium at spring meeting of A. S. T. M. in Detroit. Valuable technical data presented in four 15-minute papers

■ A SYMPOSIUM on protecting metals against corrosion attracted an attendance of 300 at the third annual spring meeting of the Detroit district committee of the American Society for Testing Materials on April 19. A wealth of technical data was crowded into four 15-minute papers.

Prof. A. E. White, national president of the A.S.T.M., and C. L. Warwick, secretary, spoke briefly at a dinner preceding the symposium. Mr. Warwick announced the 1939 regional meeting of the society will be held in Columbus, O.; the annual convention in Atlantic City, N. J., coincident with an exhibition of testing equipment; and the possibility of a regional meeting in San Francisco in July during the international exposition there.

W. H. Graves, metallurgist, Packard Motor Car Co., and chairman of the Detroit committee, announced selections for new local officers to be installed after the society's annual meeting this summer. To serve for two years, they include: Chairman, T. A. Boyd, General Motors Research Laboratories; vice chairman, J. L. McCloud, Ford Motor Co., and secretary, C. H. Fellows, Detroit Edison Co.

Dr. H. W. Gillett, Battelle Memorial institute, Columbus, O., discussed corrosion-resistant alloys and pointed out that strictly speaking there was no such thing, since, paradoxically, corrosion resistance of an alloy depends upon a film of corrosion product formed on the surface of the metal, or a barrier film. The most desirable type of film is one which is thin and flexible, and which is automatically reformed when damaged.

Various types of corrosive environment call for different selection of resistant alloy. For example, in the iron-chromium series, the 12 per cent chromium alloys are most suitable for protection against atmospheric corrosion; the 20 per cent chromium for high temperature atmospheres; and the higher chromes for liquid corrosion media, the latter often containing in addition small percentages of nickel and molybdenum.

Choice of a suitable alloy often is limited by mechanical properties induced by alloying agents, such as in the case of silicon and aluminum. Again, certain other alloys may show precipitation of carbides in grain boundaries which limits adherence of a barrier film and thus leads to intercrystalline corrosive attack.

Control Corrosive Environment

In studying the corrosion problem two other factors have been brought to bear in reducing corrosion—pretreatment of the metal itself and control of the corrosive environment. In the latter category, addition of chromate to brine in a refrigeration system is a good example.

Dr. Gillett suggested test programs be directed more toward studying the properties of barrier films than of the alloys themselves.

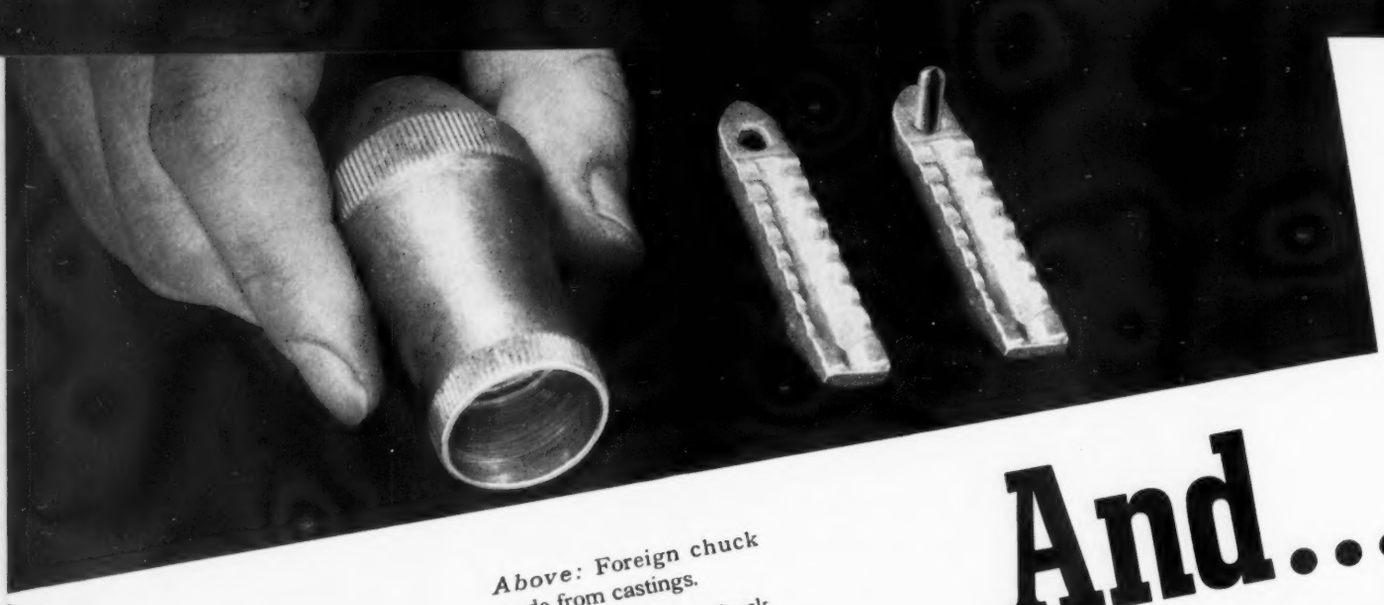
Essential features of metallic coatings were summarized by Carl Heussner, materials engineer, Chrysler Corp. He classified coatings for corrosion protection into the following:

1. Metallic coatings by immersion in molten metal bath, including hot dipped zinc, tin and terne plate.
2. Coatings applied by "cementation," such as sherardizing in the case of zinc, and calorizing in the case of aluminum.
3. Metallic coatings applied by spray gun.
4. Electroplated coatings.
   a. Corrosive resistant electrodeposits mainly for base metal protection.
   b. Corrosion resistance and appearance of electrodeposits for base metal protection and decorative appearance.
   c. Corrosion resistance and mechanical wear of deposits for base metal protection and resistance to abrasion.

Mr. Heussner gave typical bath compositions and operating conditions as practiced commercially for nearly all types of electroplated coatings, and called attention to some of the cost factors involved, cathode efficiencies and time required to produce certain deposit thicknesses.

Pre-treating of metals to prepare the surface for subsequent application of paint and enamel was considered by Ralph Wirshing, General Motors Laboratories, who reviewed in interesting fashion General Motors' experience over ten years.

From 1907 to 1928 no form of pretreatment of autobody sheets was attempted. In 1928 came the advent of Parkerizing, a development of the Parker Rustproof Co., Detroit. This treatment involved the deposition of an insoluble coating on the surface of the steel, at the same time presenting a roughened surface which provided a good bond for paint. The process required 60 minutes for completion and involved a solution of manganese dihydrogen phosphate. Operating dif-



Above: Foreign chuck made from castings.

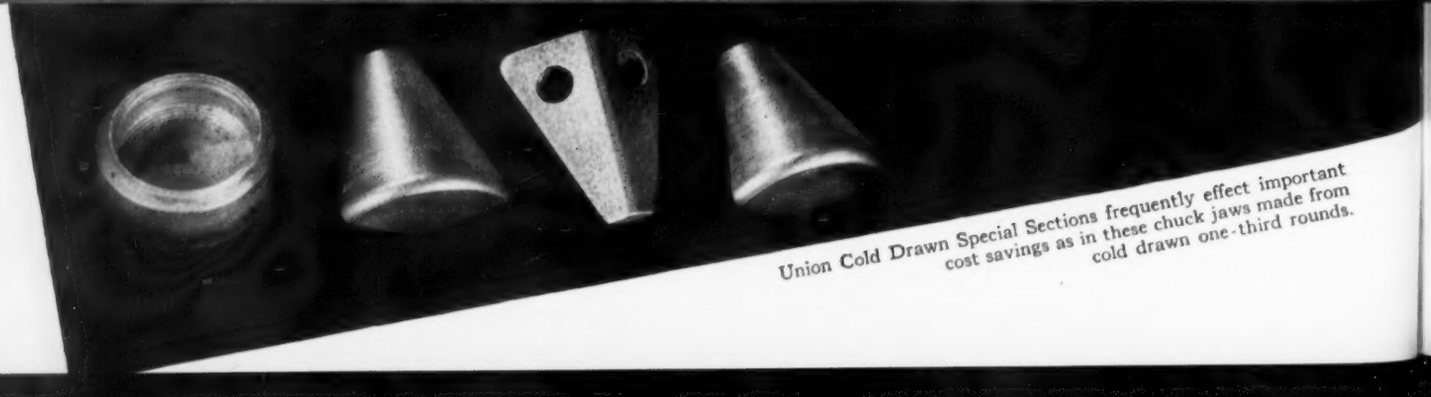
Below: American chuck made from Union Cold Drawn Bar Steel.

And...

REPUBLIC STEEL

REG. U.S. PAT. OFF.

UNION COLD



Union Cold Drawn Special Sections frequently effect important cost savings as in these chuck jaws made from cold drawn one-third rounds.

they BEAT foreign competition

DEMAND FOR LOW-PRICED TOOLS offered a ready-made market. Plant equipment was ideal for the manufacture of such items, but cheap foreign-made tools had captured the market at prices the American manufacturer could not meet.

The problem came to the attention of a Union Drawn Field Service Man who showed how, by redesign of a hand brace chuck, the part could be produced from cold drawn steel on an automatic screw machine at sufficiently lower cost to make it competitive with the foreign-made tool which used a chuck made from a casting.

Now the American manufacturer is able to meet foreign competition in price—and beat it with a *stronger, better finished* product.

Union Drawn not only makes high quality cold finished steels but also seeks to promote their most efficient use. Through its Field Service it will aid you in selecting the right steel for the job and in fabricating it to the best advantage.

This service is offered without cost or obligation. A Union Drawn Field Service Man is always awaiting your call. Make use of him.

DRAWN STEELS

UNION SUPERCUT • UNION COLD DRAWN SPECIAL SECTIONS
UNION FREECUT • UNION COLD FINISHED ALLOY STEELS
UNION HYMO • UNION PRECISION SHAFTING
UNION SPECIAL FINISH

ficulties and the protracted time were the chief objections.

In 1929 Bonderite A solution was introduced by Parker and the time of treatment was cut to 10 minutes. Parts were dipped in the solution held at a temperature of 210 degrees Fahr., and cost of treatment was lowered. Next came Bonderite B, in which a copper salt was added to the solution, reducing costs and cutting time to 5 minutes.

These three original processes had the objection of a crystallinity to the degree that treated parts required rubbing with steel wool to avoid rough appearance of the black enamel used then. A high baking temperature was also required to minimize dulling of the enamel.

A later development was the Loxal treatment of Curtin-Howe Corp., in which oxalic acid was used to produce a coating of iron oxalate on the steel. Baking temperatures exceeding 300 degrees Fahr. were not advisable with this material.

Then appeared Bonderite X which gave a finer grain to the coating and reduced time to 3 minutes and eliminated rubbing.

Subsequently the American Chemical Paint Co. introduced its "cromodizing" process which permitted treatment in 1 minute and also was adapted to a conveyorized process and application by spray instead of dip. The solution was a mixture of chromic acid and sodium chloride, applied at 180 degrees Fahr. Results were considered by General Motors as about 85-90 per cent as good as the Bonderite X treatment.

Electric Current Tried

The next step was to introduce an electric current in the solution, as typified by the Cole-Phillips process using zinc phosphate, and the Electrogranodizing process of American Chemical Paint. Objections were higher cost and troubles incident to handling the electric current.

Of recent introduction is the Spra-Bonderite treatment which has further reduced application time to 1 minute, with temperature at 180 degrees Fahr. Other developments include the spray-Granodine treatment, the Marks bond process, the zinc-coat method of Curtin-Howe which used a solution of zinc nitrate and sodium bi-sulphite at 130 degrees with a zinc dichromate rinse, and the flow-Bonderite process in which the solution is applied to local areas by brush or rag.

Summarizing, Mr. Wirshing pointed out that in ten years costs (chemicals alone) have been reduced to one-fifth the original amount, and time has been cut from 1 hour to 1 minute. In the application of pretreatments, 4 points are important to observe: A clean surface on the metal; a thorough rinse; avoidance of touching the treated surface, and quick application of the subsequent paint or enamel.

Corrosion protection by means of organic coatings was reviewed by J. L. McCloud, Ford Motor Co. He analyzed the various types of such coatings or paints from the standpoint of the four general components—pigment, binder or nonvolatile vehicle, thinner and drying catalyst.

Of course, all paints do not contain all four of these components, but they cover the usual ingredients. Taking each one of these components, Mr. McCloud further broke them down into their individual components. Thus, pigments may include oxides, hydrates salts, metals, or carbon. Binders include oil, resins, cellulose derivatives, bitumens or nonvolatile solvents. Thinners include the hydrocarbons, esters or alcohols. The drying catalysts include salts, oxides and the so-called antidriers.

Aluminum License Plates Used Since 1905

■ Use of aluminum license plates dates back to 1905 when the State of Nebraska had an aluminum circle which was fastened to the side of a motor car. In 1912 Minnesota had aluminum license plates.

Aluminum plates finished by the Alumilite process were first used last year when Connecticut adopted them as permanent plates to be in the owner's possession for several years.

The Connecticut plates, now in use for approximately a year, are claimed by Aluminum Co. of America, Pittsburgh, to be as bright as the day they were issued. Background of the plates is natural aluminum color. The year is designated by a small insert plate of contrasting color.

Advantages Claimed for White Baking Finishes

■ Sherwin-Williams Co., Cleveland, has announced a new line of white baking finishes known as KEM Appliance white enamels, for which the manufacturer claims a number of features of interest to manufacturers of appliances, furniture and general utility items.

Leading features of the new products are given as: Color stability under baking temperatures higher than usually feasible for white enamels, with tolerance of reasonable variations, assuring a dependable color match in assembled articles. Application of the material is said to be easy, and its exceptional build and opacity make possible a full rich finish of unusual beauty. In service it is said to afford maximum resistance to discoloration under exposure to extremes of light, darkness, humidity, grease and usual chemical reagents. Excellent adhesion and hardness, with high resistance to impact, marring and wear are also indicated.

Sherwin-Williams KEM Appliance white enamels are offered in both high and intermediate baking types to meet the various requirements, and it is believed this finish will find ready acceptance because of its unique baking characteristics.

New Electro-Plating Aid

■ A new material for use in removal of carbonate from plating solutions, to be known as Du Pont Carbonate Remover, is announced by the new Electroplating Chemicals division, E. I. du Pont de Nemours & Co., Wilmington, Del. A calcium sulphate compound of slight solubility, it is a precipitation agent which can be maintained in excess at all times, permitting continuous disposal of carbonate as it is formed.

•

Adds 56-inch Strip Mill

(*Concluded from Page* 41)

with two 15-ton cranes, a depressed track 525 feet long, two platform scales and a truck entrance.

Repair shop, adjacent to hot mill, is 50 x 125 feet. It serves for both mechanical and electrical repairs. Waste water carrying roll scale from hot mill drains to an outside scale pit which parallels the mill building. Pit is covered by lean-to roof and is served by a 5-ton crane operating on a runway 16 feet wide and 250 feet long. A grab bucket removes scale from pit to a hopper car placed on a drainage platform. This crane also serves the pump room. Nine deep wells supply the large volume of fresh water required for plant operations.

Malleable Iron in Aircraft Construction

■ Two types of aircraft tailwheel assemblies in which malleable iron was used have been developed by Steel Corp., Lancaster, N. Y. The assemblies were designed to be attached to aircraft using a tail spring leaf or a skid tube.

For the spring leaf assembly three castings were required; a fork, bracket and attaching plate. The skid tube required only a fork and bracket. A combination of alloys was used in the fork castings, followed by heat treating. The bracket castings were cast and treated as normal malleable iron.

WHY *Stromberg-Carlson* uses ORTHOSIL

TRADE MARK

FOR METAL CLEANING

Particularly effective in electrolytic cleaning due to its high conductivity.
Assures quicker action than other alkalis.
Prevents grease and dirt from re-depositing.
Easy to pour, quick to dissolve.
Dry — highly concentrated — economical.
Quickly removes the grease, soot, dust and various other kinds of dirt unaffected by pickling acid.
Leaves material *clean* for further processing.

"There is Nothing Finer Than a Stromberg-Carlson"—this well-known slogan reflects the high standards of the Stromberg-Carlson Telephone Manufacturing Company. Many of the metal parts that go into all of the radio sets and most of the telephones made by this company are cleaned in Orthosil solutions prior to the finishing operations.

Orthosil finds its natural place in this exacting service because of its remarkable speed and effectiveness in cutting through grease and dirt. It lays clean the metal underneath, ready for further processing. Prevents grease and dirt from re-depositing. Saves money as well as time. For Stromberg-Carlson, Orthosil has cut the cost of alkaline metal cleaning by fully 50%.

Orthosil is easy to handle, convenient to store. Try Orthosil—check it against other alkalis. Why not write now for full details? Address Department F.

PENNSYLVANIA SALT MANUFACTURING CO. · Est. 1850
WIDENER BLDG., PHILADELPHIA, PA.
NEW YORK · CHICAGO · ST. LOUIS · PITTSBURGH · TACOMA · WYANDOTTE

PENNSYLVANIA SALT *Chemicals*

Fixtures

Decreased handling, increased production and saving of setup time and labor are obtained when adequate study is made of jigs and fixtures for welded steel construction

■ ROLLED STEEL in the fabrication of electric motor and generator frames has increased greatly in use during the past few years. Along with steel construction, welding and methods to facilitate welded steel construction have received much study because efficient fabrication methods are a requisite if the full economies of steel construction are to be derived.

Experience of Reliance Electric & Engineering Co., Cleveland, manufacturer of a wide range of industrial motors and generators, demonstrates that worthwhile benefits in decreased handling, setup time and labor, as well as increased production, can be obtained when adequate study is made of jigs and fixtures for welded steel construction. Arc welded steel frames as shown in Fig. 1 are used in this company's induction motors in sizes from 1 to 200 horsepower. A study indicated that considerable economies would be experienced if suitable welding fixtures were used not only on the smaller frames within the 1 to 50 horsepower range where production runs into considerable quantities but also in the larger sizes.

Frame All-Welded

The welded frame design used in these motors consists of two rolled steel rings on which feet are welded. Cross bars are welded between these rings to form the cage which holds the core.

Fabrication is started by cutting bar stock of rectangular cross section to lengths suitable for the rings. Either square saw-cut or V-flame-cut ends are utilized depending upon the type of weld. After forming, a ring is inserted in the fixture shown in Fig. 2. An air cylinder actuates the clamps which hold the ring in position and bring the ends together for welding. After being tackwelded, the ring is removed and the weld is completed by a second operator. Various sizes of rings are accommodated by interchangeable clamping sections which fit into the fixture.

Next operation is preparation and addition of the feet. Rectangular bar stock is cut into lengths each long enough for two feet. Two right angle bends are then made forming a Z. The feet are separated and shaped to fit the ring onto which they are welded by making two curving cuts with an oxyacetylene flame. This is done by an automatic templet guided torch.

A simple clamp jig shown in Fig.

(*Please turn to Page* 80)

Fig. 1—Induction motor frame and core, made entirely from welded steel

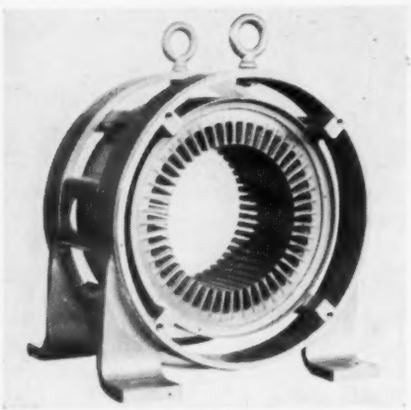


Fig. 2—First step in making frames is to weld ends of rolled bars to form rings. This air-operated fixture with interchangeable parts accommodates many sizes

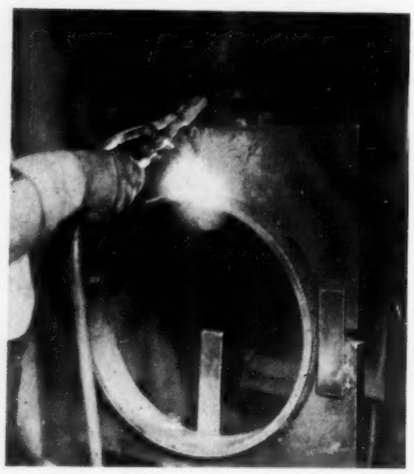
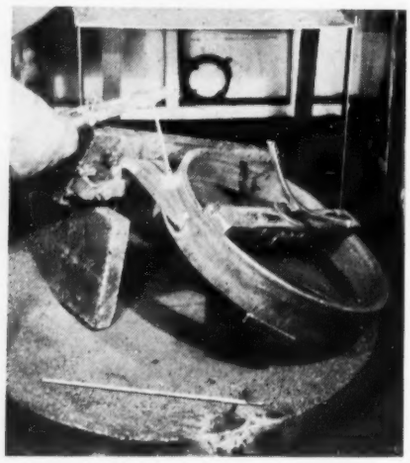


Fig. 3—This clamp jig positions the feet on the rings while they are tack welded, the second step in making the frame



Whitey Sez:

"We arrive at 7309 Union Avenue, where our fabrication of better arc welding electrodes starts ... A fitting street name for their manufacture— wherein a more perfect Union of metals is assured."

MAURATH, INC. BUILDER OF BETTER WELDING ELECTRODES IN ALL ANALYSES

CLEVELAND

Process Develops Photographs on Metal

■ A method of making pictures on metal which is more accurate than those taken on paper was recently disclosed by Aluminum Co. of America, Pittsburgh.

The pictures are made on a metal about 0.16 inches thick which contains an oxide coating, with the sensitive silver salts that react to light. When exposed to light sent through a negative an image is produced on the metal.

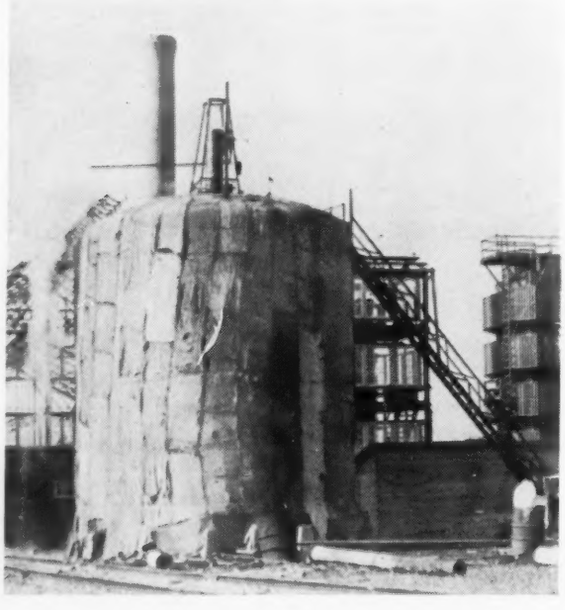
This method of making pictures is claimed to be absolutely accurate as slight changes of temperatures will not cause the metal to contract or expand as in the case of paper prints.

A valuable use of the metal pictures has been found in aerial surveys where accurate calculation of distances is needed.

Another of the "World's Largest"

■ The 120,000-gallon rubber-lined tank shown in accompanying illustration was recently installed by Consolidated Chemical Industries at Ft. Worth, Texas, for storing hydrochloric acid, extensively used in treatment of oil wells to increase their flow. Tank is 26 feet in diameter and 25 feet high, utilizes welded steel plate construction and is lined with a 3/16-inch of Triflex rubber.

A major problem in lining the tank involved heating to vulcanize the lining. This was accomplished by covering the outside of the tank with fabric to retard radiation, then filling it with water which was brought to the boiling point by injecting live steam. Engineers figured steam requirements from heat radiation loss based on normal atmospheric temperature for that time of year around 60 degrees. Under these conditions, it was estimated that a single portable boiler could provide all the steam required. However, about the time vulcanizing was started the temperature dropped to about 20 degrees above zero. To provide additional steam a railroad locomotive was run up and connected. Illustration shows the fabric covered tank with the locomotive and boiler on either side of it.



Large welded hydrochloric acid tank. Rubber lining is being vulcanized in place using live steam. To minimize heat loss by radiation, outside of tank is shielded by fabric covering. Photo courtesy B. F. Goodrich Co., Akron, O.

Technical Ore Analysis For the Metallurgist

■ *Technical Analysis of Ores and Metallurgical Products,* by Franklin G. Hills; cloth, 198 pages; published by Chemical Publishing Co. of New York Inc., New York; supplied by STEEL, Cleveland, for $3; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This book covers the analysis not only of the usual ores and metallurgical products, but also of those of rarer occurrence, about which information is not so readily available. It reports important chemical reactions, although it assumes the reader is familiar with elementary chemistry. References are given at the close of the chapters. It offers the chemist, student and engineer, information on practically all proved methods of metallurgical analysis.

The author gives the accepted methods of analysis for any particular substance and explains why certain procedures are desirable in special cases. Careful selection can often save time and money. On certain samples, such as "picked" specimens from ore deposits, where the results can be of little value, great accuracy is not essential. On the other hand, analysis of copper concentrator heads and tailings, on which the accuracy of a metallurgical balance sheet depends, demands the most careful work. This is stressed in the introduction and throughout the book.

Interfering elements are discussed in connection with all the methods given. Although a high school boy can be trained to do routine analytical work, says the author, a real chemist is needed to meet the unusual conditions that may arise from interfering elements which might be present in the sample.

Lansing Foundry Meeting Studies Casting Defects

■ A symposium on casting defects occupied technical sessions of the seventh annual foundry conference at Michigan State college, East Lansing, Mich., April 15-16, under sponsorship of the college and Detroit chapter of the American Foundrymen's association. About 150 attended. The matter of casting defects was considered under three general heads, namely, molding and core sands for gray iron, steel and malleable iron; metal composition and melting; and foundry equipment.

E. K. Smith, Electro Metallurgical Co., Detroit, stated that high blast, moisture, low bed, oxidized scrap in the charge, and condition of sand in the mold, are the most prevalent causes for chilled edges and corners, porosity and leaks in castings.

A paper by Enrique Touceda and James H. Lansing, Malleable Founders' Research institute, Cleveland, pointed out that cracks in castings can be traced to mechanical operations and inherent metallurgical conditions.

Insulated, covered ladles have proved to be decidedly economical, declared Carl Joseph, Saginaw Malleable Iron division, General Motors Corp., Saginaw, Mich. In addition to preventing any appreciable loss in temperature between furnace and molds, the lining in these ladles, a mixture of silica and alumina oxide, stands up for an average of 80 heats, as compared with a life of three or four heats in the open ladles formerly employed.

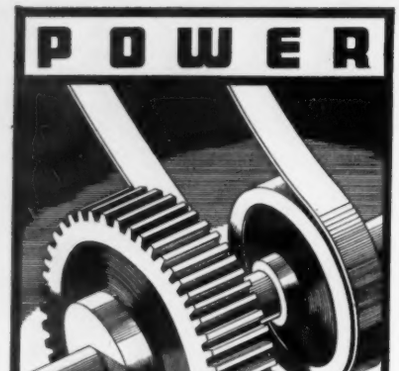
Prevents Kinks

■ With the introduction of Scott fish wire by Rattan Mfg. Co., New Haven, Conn., electricians and engineers need no longer worry about getting the wire to run through the various bends of conduits. Tapered end of the fish wire leads it with ease around bends without causing it to kink or catch.

Steel "SUITS" TO ORDER

The welder is a tailor whose materials are gas or electricity, iron and steel. His "stitches" are deft and sure, strong and true. And the handsome "suits" he turns out can be anything from a refrigerator to a gleaming stainless steel train. Where would industry be today without the benefits of welding? Realizing the importance of this relatively new science, Armco Research has devoted and is devoting much time to special welding problems. We should like to work with you on this or other fabricating questions. Just tell us what you want us to do. The American Rolling Mill Co., 1130 Curtis St., Middletown, O.

ARMCO METALS ARMCO **BORN OF RESEARCH**



Grinding Wheel Drives

Vibration is eliminated through the application of multiple V-belts to grinding wheel drives. Vari-pitch sheave permits adjusting speed to suit the abrasive used

By F. L. IVES
Engineer, Texrope division
Allis-Chalmers Mfg. Co.,
Milwaukee

■ APPLICATION of multiple V-belt drives to grinding machines overcame a fault that had troubled manufacturers for a long time: Namely, vibrations transmitted to the grinding wheel. In applying the V-belt, it was found that the endless, resilient drive absorbed all the vibration and load shocks that previously had been transmitted to the wheel and caused undesirable marks or imperfections on the finished products.

The first application of multiple V-belts on grinders was on an ordinary shop grinding wheel, as a slipless short center drive, which enabled the machine to handle the heavy overloads ordinarily met in shop service. The drive operated so smoothly and efficiently that it was applied to grinding machines of more intricate types, where it maintained a constant speed on the wheel.

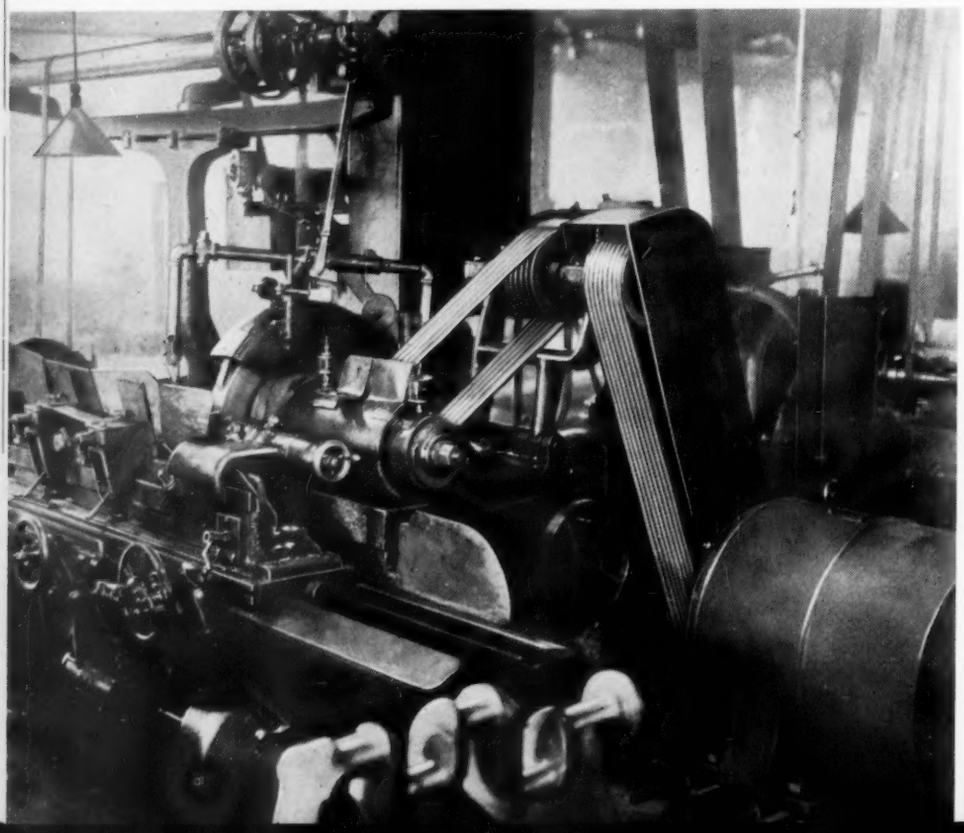
As the grinding heads of many machines oscillate, belts must be bent over idlers and spring loaded take-ups to maintain constant tension on the drive. In many cases this practice causes reverse bending of the belt, which is detrimental to the belt as in the process of its manufacture it was cured in a circular mold.

The V-belt drive on grinders came into prominence when applied to a piston pin or centerless grinding machine. This machine provided high mirror-like finish without marks or shadings.

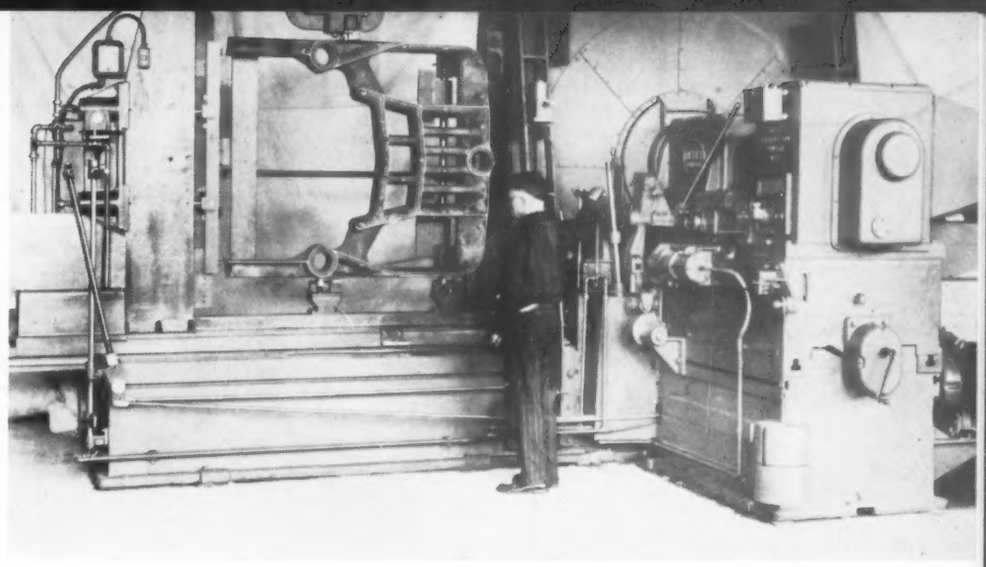
Lately a new type of multigroove sheave, the vari-pitch unit, has been introduced to provide adjustable speed. The use of this sheave on grinders has shown a considerable saving in the cost of grinding wheels, as it has enabled the operator to get maximum use out of a wheel while maintaining a constant peripheral speed, irrespective of decreasing wheel diameter.

The use of this vari-pitch sheave in connection with grinding wheels allows operator to adjust the revolutions per minute of his wheel to its proper speed for the grade of abrasive to be used. As the grinding wheel decreases in diameter, through usage, it can be speeded up to maintain a proper peripheral or rim speed. Rim speed of a grinding wheel is very important in obtaining the desired finish.

An arrangement has been incor-



Increase in production was obtained on crankshaft grinding in a tractor plant after changing to this drive arrangement



Special double - head grinder, multiple V-belt driven for simultaneously facing both sides of a cast iron boiler section

porated in one type of grinder, wherein the wheel guard had been connected through linkage to the sheave adjusting mechanism so that the wheel can never be run at an excessive speed, but automatically maintains the proper number of revolutions per minute for the diameter of the wheel. This is a safety factor of considerable importance. The vari-pitch sheave, as now manufactured, has an average adjustable speed range of 15 per cent when used in connection with a fixed pitch companion sheave. If used in pairs, the range is 30 per cent.

Vari-pitch or adjustable speed sheave is composed of movable plates or circular members mounted on a quill, the plates having beveled edges and when used in pairs form the grooves. Spacing of plates is governed by a lead screw which causes the plates to come together or separate, being spaced at such a distance that the variable pitch diameter meets the operator's requirements as to speed ratio.

These vari-pitch sheaves are of two types: One type is adjusted while stationary by means of spanner nut and wrench; the motion controlled type can be adjusted while running, thrust of the adjusting screw being taken on ball bearings. The motion controlled sheave is used in the grinding machine mentioned.

Know Construction

To understand the action of the V-belt, one should know something of its construction. The belt is divided into three zones in its cross section; upper zone at the outer circumference is designed to stretch when the belt is bent but to maintain the belt shape. The middle zone takes the driving tension and should have very little stretch or elasticity. The lower or inner section takes the compression of the belt in bending and, as rubber will not compress, it must flow. This causes extra pressure against the sides of the groove and increases the driving power. Composition of rubber of this lower section governs life of belt.

The belt depends on the middle section for its strength and ability to resist driving shocks and absorb vibration, thus giving a smooth-running, efficient drive.

Tests have proved that the multi-V-belt, as now manufactured of semi-elastic tension cords and controlled composition rubber, can distribute the load among the individual belts regardless of minor inequalities of workmanship and difference between belt lengths.

Despite the fact that all belts of a given size and length are wound on the same sized drums under equal tension and cured in the same identical metal molds under constant equal tension, the belts do not maintain a constant length; they must be checked and classified under an allowable tolerance so that a drive will look well when running.

Assume Equal Length

The belts on a drive do not have to be of exactly the same length to start with. After driving tension has been applied and the belts run for a time, the belts will assume equal length.

The V-belt drive depends primarily on friction for its driving effort; it must have sufficient tension between shafts to fully develop the pulling power of the belt. This tension is less than that which would be maintained on a flat belt drive, but there must be enough tension to prevent slipping on starting.

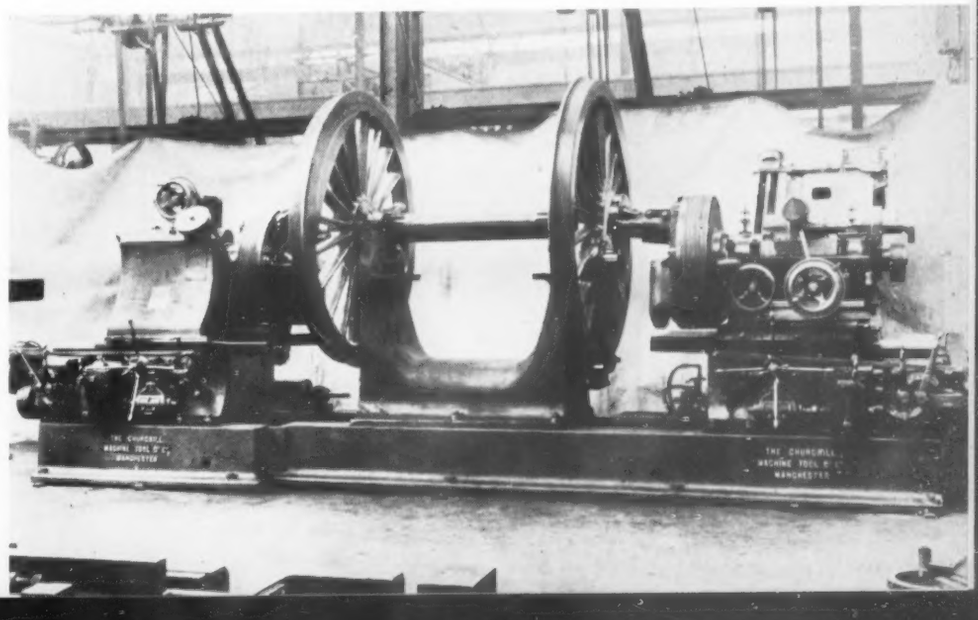
It is best to allow the manufacturer to design your complete drive so that there will be no divided responsibility. A well-designed drive operated with sufficient tension will transmit full power at high efficiency without slip. The only loss in ratio will be creep, which cannot be overcome with any elastic materials in a friction drive and varies with the changes in load being transmitted.

To understand creep, it is best to assume a semielastic belt running over two sheaves with unequal tensions on tight and loose sides due to transmitting power. The belt on the tight side stretches a certain amount depending on the load. The slack side of the drive has much less stretch, so the belt must adjust itself to the difference in length between the tight side and the loose side while passing over the sheave. This difference or creep is a negative quantity and will cause a loss in speed.

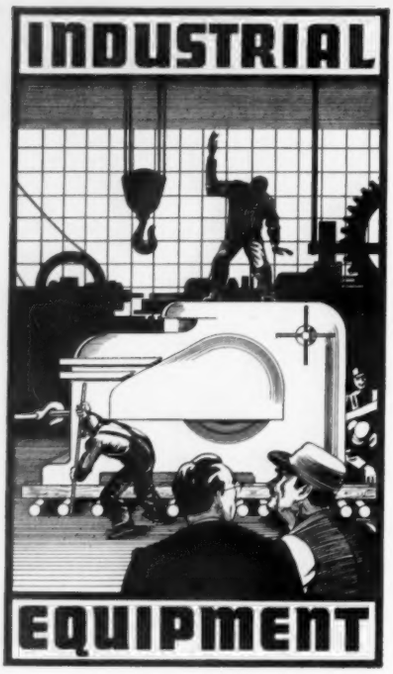
The V-groove drive is very carefully designed and engineered by the manufacturer and when used in connection with the vari-pitch sheave constitutes a highly efficient drive for use on machine tools, especially as it is capable of carrying heavy overloads.

♦

"Keep the plant in running condition at all times," is a good slogan for those in charge of power drives.



Multiple V-belt drives on both heads of large English machine for grinding locomotive crankshafts and crank pins



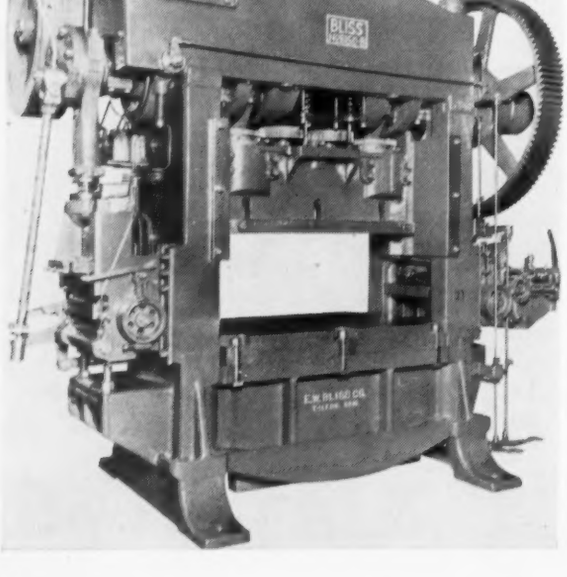
15-Horsepower Motor Drives Huge Press

■ E. W. Bliss Co., Brooklyn, N. Y., has added to its line of presses a high production press arranged to operate at 30, 45 and 60 strokes per minute by the use of a 15-horsepower multiple speed motor through V-belts to the flywheel.

Clearing distance between uprights is 60 inches, while the bed area is 36 x 60 inches. Crankshaft is of the double eccentric type. Alignment is maintained by rigid, square type gibs which are made extra long and hand scraped. A double roll feed is used on the press, and it is adjustable for any feed length from 0 up to 15 inches per stroke. Combined with the feed is a 7-roll, power driven straightener and a shear type scrap cutter that can be adjusted for cutting clearance.

Lubrication consists of an automatic force feed system to all the main bearings. The clutch is the long hook, rolling key type with full length locking pawl and a releasing brake. The main and crankpin bearings are bronze bushed, and the driveshaft runs in Timken roller bearings.

Frame is of tie-rod construction, consisting of bed, crown and the uprights, all held together by steel tie-rods. These members are high test, pearlitic cast iron of high tensile strength and surface hardness.

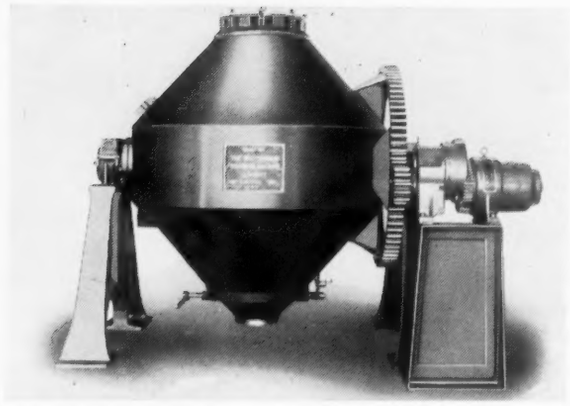


Conservative rating of this Bliss high production press for fine dies is 150 tons, while its capacity is 190 tons

Conical Machine Mixes Dry Powders

■ Patterson Foundry & Machine Co., East Liverpool, O., has placed on the market a conical type dry blender or mixer suitable for mixing dry powders, colors, pigments, chemicals, minerals and synthetic compounds of all kinds.

The mixer is fabricated in plain steel, stainless steel and other metals, and is furnished in several sizes. Uniformity in a short mixing time is the outstanding performance of the unit. An improved method of loading and discharging has also been provided making cleaning an easy matter, and allowing many different materials to be handled.



Uniformity in a short mixing time is the outstanding performance of this Patterson conical type dry mixer

Lubricating Units Are Streamlined

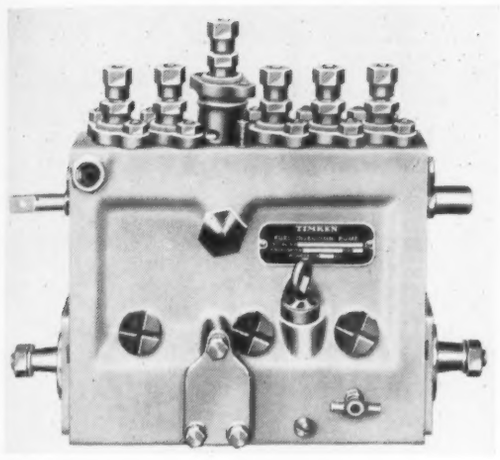
■ Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, has placed on the market Alemite automobile lubricating units which are completely covered by metal cabinets built along modernistic lines.

By means of this Stewart-Warner Alemiter, speedy operation in the application of motorcar lubricants can be affected

The Alemiters consist of lubricant containers, pumps, meters, hose, guns and all other equipment necessary for a complete automobile lubrication department. The smaller sized units are movable, but the castors can be removed converting them into stationary units. The larger units are permanently stationary.

Renewable Pumping Unit Is Rigidly Constructed

■ Timken Roller Bearing Co., Canton, O., has placed on the market



Timken renewable pumping unit is pre-metered at the factory. This eliminates any pump calibration or metering in the field at time of installation

a renewable pumping unit which has a diameter range from 4 to 9 millimeters, for use in its fuel injection pumps.

Pumping unit is a self-contained, pre-metered and timed mechanism. It consists of a rigid barrel and plunger, delivery valve and delivery valve spring. It is held tightly in the injection pump housing by means of two hexagon nuts threaded on two studs in the pump housing, pressing against a flange on the upper end of the pumping unit body. The pumping unit is aligned axially in the housing, flange holes being so slotted as to bear tightly on two sides of one of the dowel studs.

To assure calibration of one unit in relation to the other pumping units, means are provided so unit can only be slipped into the housing when it is so set that pinion gear on the upper metering sleeve will properly index the correct teeth in the control rack rod of the injection pump. This is affected by providing a protruding nib, 2 teeth wide, just below and connected to the unit pinion gear. This nib extends from a flat surface which to be correcly set, must be in line with a second flat surface on the unit body.

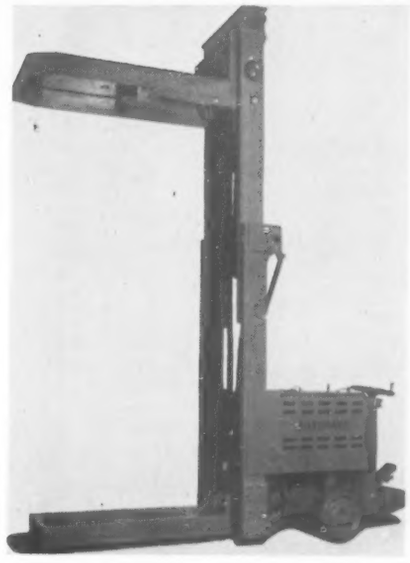
When the metering pinion gear is so rotated as to line up these two flats, nib then protrudes straight out from the unit. This nib next indexes a double tooth space in the control rack rod when the unit is set up and the control rod is held in full step or shut-off position. Thus unit can be neither pulled out of the housing nor slipped in unless the nib and control rack rod are in their proper positions.

Telescopic Lifter Saves Storage Space

■ Automatic Transportation Co., Chicago, has developed a telescopic high lift platform truck of 5-ton capacity to facilitate conserving storago space of materials on skids by tiering and still permitting transportation under low doorways.

This machine has a lifting height of 168 inches when uprights are fully extended, and a lift of 91 inches when they are collapsed to 119 inches. Platform dimensions are 36 inches wide, 72 inches long and 11 inches high in low position for skid entry. Lifting range and platform dimensions can be modified within reasonable limits to suit particular requirements. The platform can be raised to normal lifting height or can be fully telescoped at will of operator.

As a safety feature, platform speed in descending is controlled by a built-in dynamic brake. Full safety limit switches are provided for maximum travel range up and down. The drive unit is a combination bevel and spur gear transmission, with

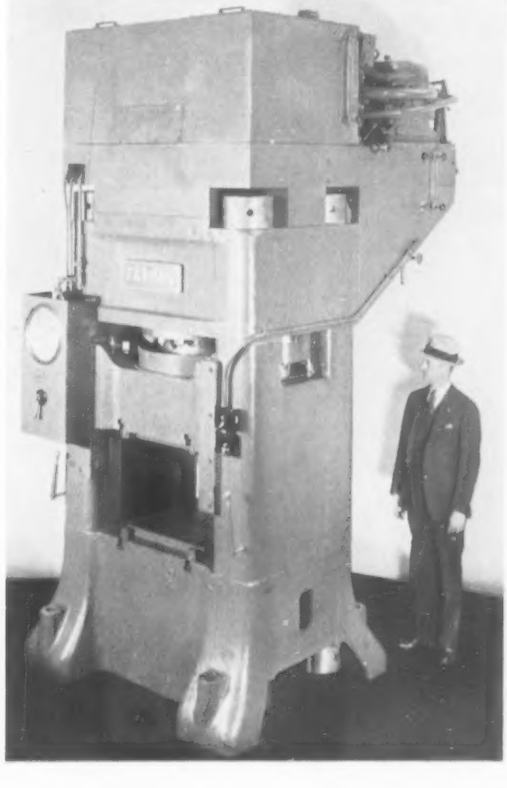


Automatic lifter has a lifting height of 168 inches when uprights are fully extended, and a lift of 91 inches when they are collapsed to 119 inches

full floating drive shafts and V-type universal driving joints. It is torque mounted with three point suspension. Entire rear part of the chassis is supported by helical coil springs, two to each side of the truck.

Hydraulic Press Molds Automotive Brake Blocks

■ Farrel-Birmingham Co., Ansonia, Conn., has placed on the market a



This Farrel-Birmingham hydraulic molding press has a stroke of 24 inches with the same amount of opening. Maximum capacity of the unis 500 tons

hydraulic molding press for molding automotive brake blocks. It is of the self-contained, individually powered type, with a motor-driven pump mounted on top of the press.

Maximum capacity of the press is 500 tons with one down-acting ram 21 inches in diameter and two 6⅛-inch double acting cylinders mounted in the top crosshead and working under an initial pressure of 2600 pounds per square inch.

Stroke of the press is 24 inches with the same amount of opening. The platen area is 38 x 31 inches. Both the bottom and moving crossheads are provided with T-slots for the attachment of molds. Adjustment of the moving crosshead guides is made by adjustable bronze gibs sliding against the finished interior surfaces of press side frames.

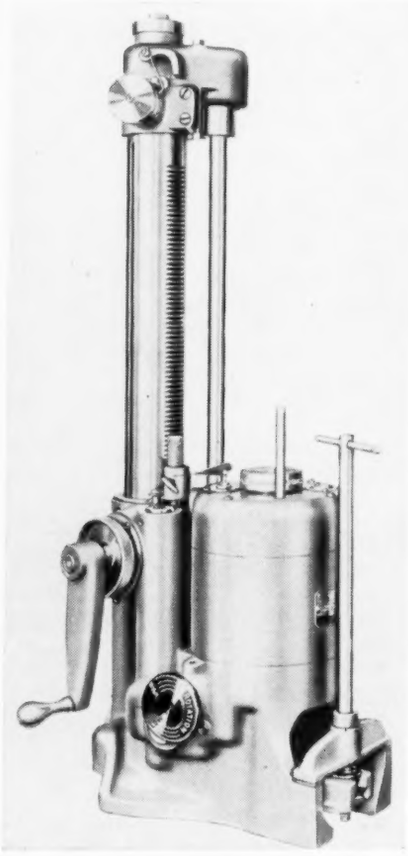
Pressure regulation ranging from 10 to 500 tons is governed by a control panel. By means of a selective pressure system, this range of pressures has an infinite variation from minimum to maximum. Any ten pressures in this range may be set for immediate selection. On the low selection of pressures the 6⅛-inch double acting rams are used alone, and develop a minimum pressure of 10 tons to a maximum of 75 tons. Above the 75 ton range, press pressures are developed by both the 6⅛-inch rams and the 21-inch main ram.

Dwell of the selected pressure on the work may be automatically timed from 2 to 40 seconds by an automatic timing device. Push button control is provided to control the working cycle of the press. The power unit mounted on top of the press is a 23.8 gallon per minute radial piston pump equipped with an oil tank.

Boring Bar Is Handled by One Man

■ Van Norman Machine Tool Co., Springfield, Mass., has placed on the market a powerful boring bar that will take large cuts at high speed and yet is light enough for one man to handle.

The bar will bore or sleeve any diameter from 2.600 to 5.343 inches, and has enough power provided throughout the entire range by a ½-horsepower capacitor motor. The machine has two feeds and speeds, and takes a 0.050-inch cut at any diameter within its capacity. The gears are totally enclosed and life-lubricated. This No. 777 unit also is equipped with four non-revolv-



This Van Norman boring bar has two feeds and speeds, and takes a 0.050-inch cut at any diameter within its capacity

Reduce Overhead Crane Overhead with AMSCO "DOUBLE WALL" WHEELS

TRADE MARK REGISTERED

Made of AMSCO Manganese Steel, "the toughest steel known," they are unequalled in resistance to shock and wear.

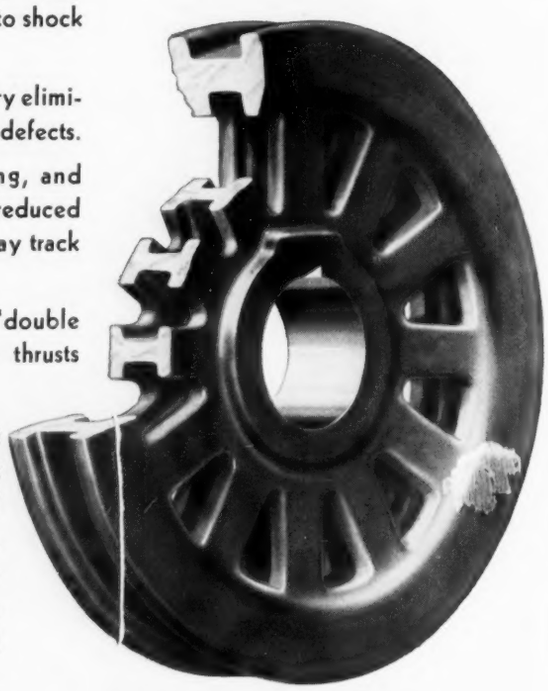
X-ray inspection at the foundry eliminates wheels with internal defects.

Tread cracking or flattening, and flange or web breakage are reduced to the vanishing point. Runway track wear is lessened.

The obvious strength of the "double wall" design nullifies side thrusts and overloading stresses.

Proved by years of heaviest service, they outwear cast iron, cast steel, rolled steel and surface-hardened wheels. They are definitely economical as evidenced by hundreds now in use in steel mills and other plants.

AMSCO "Double Wall" Crane Wheels are available in all sizes for all cranes. Write for data sheet, prices and performance records.



Do not confuse genuine austenitic Manganese Steel, containing 10.00 - 14.00% manganese, with so-called manganese steels containing only small percentages. There is no substitute for the combination of strength, toughness and wear-resistance found in genuine Manganese Steel.

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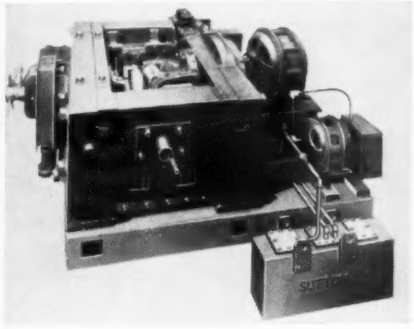
ing, expansible catspaws that guide the flycutter steadily all the way to the bottom of the bore, giving a finished job in one cut without honing.

Straightens Bars and Tubes with Upset Ends

■ Sutton Engineering Co., 1209 Park Bldg., Pittsburgh, has introduced a single cross type straightening machine for straightening round bars and tubes with upset ends. It has one driven roll with one opposed idler roll.

Both rolls have a concave contour. They are angularly adjustable to give proper deflection for straightening. Idler roll also is laterally adjustable in the direction 90 degrees to the pass for setting to different sizes and pressures.



Automatic release of Sutton straightening machine's idler roll permits upset ends of bars or tubes to pass through the rolls

Main feature of this unit is the automatic release of the idler roll to permit upset ends of the bars or tubes to pass through. This release is actuated hydraulically. A pump which is an integral part of the machine furnishes the oil pressure. A finger located at the entering end of the machine closes an electric circuit which in turn operates a solenoid-operated valve. Operation of this valve releases the idler roll allowing the upset end of the bar or tube to pass. Roll is brought into pressure position by means of push button station which also allows operator to release the roll at any time during the straightening process.

Polyphase Motor Takes Low Current

■ Wagner Electric Corp., 6410 Plymouth avenue, St. Louis, has introduced a type RT polyphase motor that takes a low starting current and has a high starting torque.

The motor has a locked torque of about twice the full load torque and a locked current of from three to three and one-half times full load current. The rotor is the primary member and carries a winding which is connected to the line when the motor is operating. The secondary member is the stator and has two windings, one of which is a high resistance short-circuited winding and the other is a low resistance insulated winding.

Short-circuited winding is placed in the bottom of the stator slots where the heat produced in this winding is transferred to stator core and removed by ventilating air which passes over the stator core. The winding is further protected by a thermal device, and if the motor should become accidentally locked, the thermal device operates and breaks the circuit leading to the holding coil of the primary magnetic contactor, disconnecting the motor from the line. This thermal device operates in the same way in case the low resistance winding should become accidentally open-circuited. The motor is controlled by a magnetic starter which contains two contactors. One of these is the line switch which closes immediately when the button is pushed. The second contactor short-circuits the low resistance winding after a definite lapse of time and may be adjusted to suit the time

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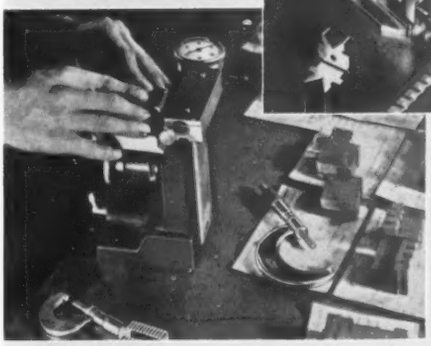

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required to accelerate speed. The motor is available in a large variety of ratings, but is being built only in sizes of 40 horsepower and larger.

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Testing Society Issues Its 1937 Proceedings

■ *A.S.T.M. Proceedings,* 1937, in two parts, 1365 and 707 pages; published by American Society for Testing Materials, Philadelphia; supplied by STEEL, Cleveland, at $5.50 each in stiff paper, $6 in cloth and $7 in half leather; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Included in Part I are reports of 45 committees, outlining important standardization and research work, and 118 specifications and tests prepared for the first time in 1937 or revised. Nine of the reports involve ferrous metals, including steel, yield point of structural steel (final reports), wrought iron, cast iron, corrosion, malleable iron castings, iron-chromium-nickel steel and related alloys, fatigue of metals and effect of temperatures on metals.

Seven reports deal with nonferrous metals, including copper and copper alloy wires for electrical conductors, nonferrous metals and alloys, corrosion, electrical heating and electric furnace alloys, copper and copper alloys, die-cast metals and alloys and light metals and alloys.

The presidential address by Dr. A. C. Fieldner on "Fuels of Today and Tomorrow" is also included in Part I.

In Part II are presented 47 technical papers and the Edgar Marburg lecture on "Plastics—Some Applications and Methods of Testing." Extensive discussion of the papers is included. Among the papers are addresses on weld metal, cast iron, analysis of the brinell hardness test, fatigue properties of nonferrous sheet metals and metals used in aircraft construction.

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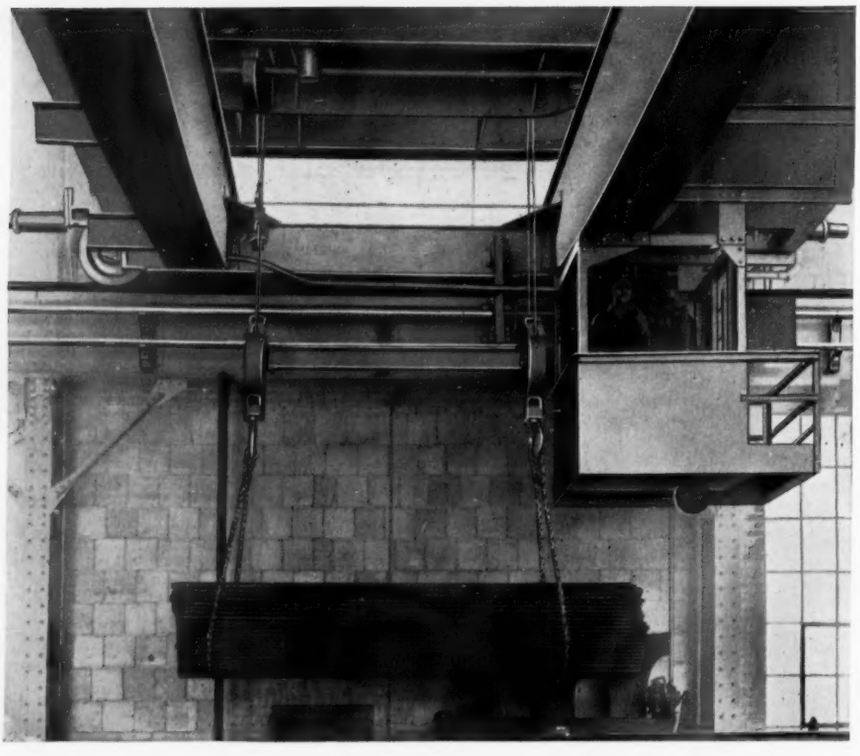

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MATERIALS HANDLING EQUIPMENT

Vibration and Noise

(*Concluded from Page* 50)

quickly show origin of noise or vibration.

An interesting application is in production testing of small and large electric motors for noise and vibration. Several manufacturers are making these tests right on the production line. A sound-insulated box is used which is large enough to fit over the motor being tested. A microphone is mounted permanently in the box and connected to the sound level meter through an extension cable. The box is placed over each motor in turn as it comes down the line. Then motor is started and its sound intensity read directly on the meter. Motor is rejected or accepted by comparing the reading obtained with standard limits already set up.

Vibration tests are made in the same manner except that the soundproof box is not necessary. Vibration levels at points on housing, bearings and mounting can be held within definite limits affording a quick check on operating characteristics.

Already manufacturers of much household equipment such as washing machines and vacuum cleaners are using these studies to improve their product. In most cases it is more economical to eliminate the noise at its source rather than at the point where it has been found bothersome. However there are three possible ways to reduce the noise—insulate, cover up or absorb the noise where it occurs; change the transmission medium (inserting insulating material); and reducing or eliminating the noise at its ultimate source. The best method in any particular case is one which involves some study and consideration of cost practicability and effectiveness of the proposed solution.

Fig. 5—View showing flasks being returned as they approach the cope and drag machines

Mold Conveying

(*Concluded from Page* 58)

is apparent from them that operations become continuous even though the molds weigh up to 2½ tons. Production is thus expedited with a minimum of effort, based upon a well-known principle of materials handling.

Fibrous Glass Is Used for Insulation

■ A new application for fibrous glass manufactured by Corning Glass Works, 79 Walnut street, Corning, N. Y., has been developed by the American District Steam Co., North Tonawanda, N. Y., for insulation of underground steamlines.

Known as ADSCO-Corning filler insulation, the fibrous glass is composed of long, flexible fibers of true glass in a soft, resilient mass resembling cotton batting but possessing the permanence and chemical characteristics inherent in glass.

It has been proved by tests to possess a high thermal insulation efficiency with a very low conductivity rate of 0.33 at 4 pounds density. Glass fluffs under vibration instead of packing, settling or disintegrating under such conditions. It is fireproof and claimed to be unaffected by water, acids or fumes. The fibrous material is light in weight, being from ⅛ to ¼ the weight of other types of insulating materials and will not corrode pipes when dry or in the presence of water. It will not compress when thoroughly saturated with water and when dried out retains its original form without expansion.

Fibrous glass is packed in strong paper bags at a density which is suitable for maintaining a thermal insulation efficiency for pipe lines operating at a mean temperature of 650 degrees Fahr., or can be supplied for higher temperatures.

Gyroscope Stabilizes Regulator Action

■ To stabilize a position regulator used to control the speed of one motor with respect to a reference speed, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has devised a gyroscope which controls the low speeds found in machines similar to brick forming machines used in brick plants.

For example, in a brick plant the speed of a cutter on a brick forming machine must be controlled to cut equal lengths of brick from clay extruded at a very slow rate. A small wheel rides on the extruded clay and drives one side of a differential. The other side is driven at a constant reference speed. If the two speeds do not match, the differential operates a position regulator which in turn acts to correct for the difference in speed.

A small gyroscope which is a part of the position regulator gives an anti-hunting action to the regulator as it anticipates any deviation from the reference position. Since little power can be obtained from the friction drive wheel operating on the clay, it is necessary to provide large amplification in the regulating system so that the relatively large power required by the output motor can be controlled. Large amplification within the regulator gives unusually high sensitivity to the control system.

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Regular Lay
Lang's Lay
Hemp Center
Wire Rope Center
Metallic Core
Seale - Filler Wire
Warrington

Welding Fixtures

(*Concluded from Page 66*)

3, is used to hold the feet in correct position against the ring while they are welded in place. Studs and projections on the jig locate parts in correct alignment.

Frame is assembled in the fixture shown in Fig. 4. Rings and cross

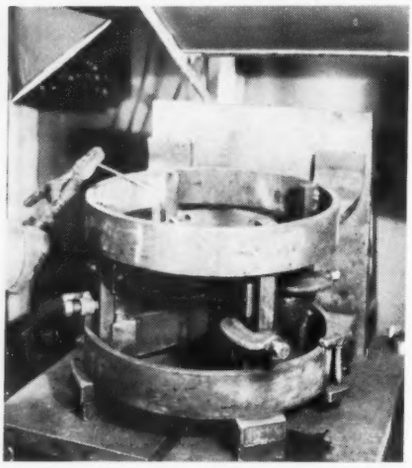


Fig. 4—Accurately locating parts is essential. This clamp fixture determines frame diameter and length. Core fits in this steel cage without further machining

bars are clamped into place while tack welds are made after which the assembly is removed and finish welds made by another operator. With this equipment it has been found possible to make the dimensional tolerances so small that little finish machine work is required. This, of course, means lower costs and a maximum rate of production.

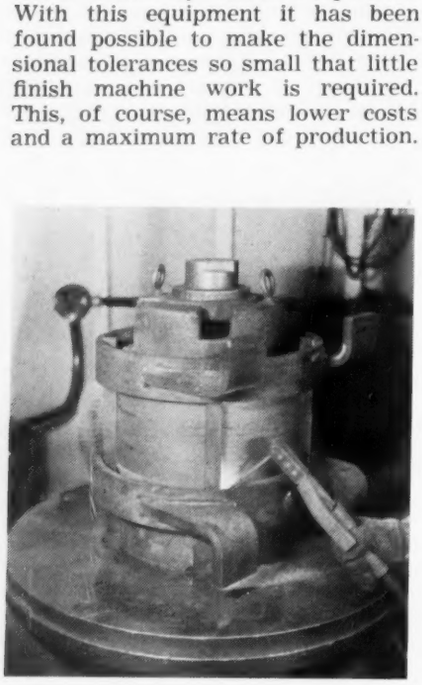


Fig. 5—Air cylinder actuates the top plate to pull core laminations up tight against a bottom plate. Welding end rings to cross bars maintains pressure permanently

To complete this stator frame, the fixture shown in Fig. 5 is employed to clamp the stator core in the steel cage just formed in the preceding operation. The stator core consists of the correct number of electrical sheet laminations with a heavier sheet and a ring at each end to support these laminations. The fixture utilizes an air cylinder to pull the laminations down tight as a perfectly solid core is essential to assure a quiet operating motor. Interchangeable sections enable a wide variety of frame sizes to be accommodated.

One of the problems in motor construction is to maintain perfect concentricity so there will be a uniform air gap between the stator and rotor cores in the completed motor. This problem is solved effectively by the use of the welding fixtures which maintain extremely close tolerances between the parts. In machining the frame, an expanding arbor is inserted in the core and this serves to maintain concentricity established by the welding fixtures.

Using one operator to place the

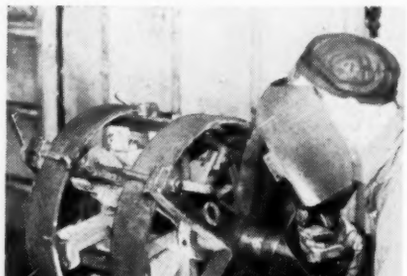


Fig. 6—Jig, welding large frames, is hinged at one end to allow raising to the vertical as well as the position shown. Full rotation in horizontal position permits making "down" welds at all points

parts in the fixture and to make the tackwelds enables a second operator to complete the welds quickly and without loss of time. As a result of the efficient operation of these fixtures, an appreciable increase in production has been experienced. A complete roller conveyor system of the gravity feed, ball bearing type assures a steady flow of parts between the various welding stations shown in Figs. 2, 3, 4 and 5.

Large frames are made in the fixture shown in Fig. 6 which is somewhat more elaborate than the corresponding fixture for the small motor frames shown in Fig. 4. As the small frame fixture is utilized only to tack weld the parts in place, positioning for welding is not difficult. The operator doing the finish welding merely moves the assembly around on the workbench as he welds.

The large fixture in Fig. 6, however, contains provision for completely positioning the work for "down" welds at all points. This is accomplished by incorporating a pivot at one end. This permits the entire assembly to be swung to the horizontal plane in which it is free to revolve so that all welds can be made in a horizontal position assuring good fusion and maximum speed.

In operation, lower ring is fitted in place. Then cross bars are clamped onto the fixture in slots which align them accurately in position. C-clamps, hinged at the end toward the center of the fixture, are swung out over the cross bars and contain screws for holding down the bars. Upon completion of welding, C-clamps are loosened and permitted to swing in so they clear the end ring thus permitting removal of the assembly from the fixture.

As both the smaller frame sizes made on the gravity conveyor and the larger sizes assembled in the large fixture are made in considerable volume, it is estimated the use of the fixtures described has resulted in a 15 per cent reduction in costs as well as a 25 per cent increase in production.

♦

French Metallurgical Text in New Edition

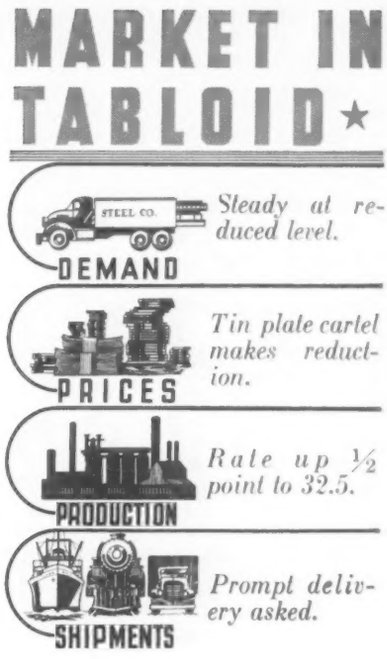
■ *Metallurgie*, by R. Cazaud; fabrikoid, 393 pages, 3¾ x 5¾ inches; published by Dunod, Paris, France; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This handy, pocket-size compendium is the fifty-fourth edition of a well-known work, which is printed in French. It is divided into seven principal sections, of which the first deals with general metallurgy. That section covers metallurgical agents, metallurgical equipment and apparatus and procedure for electrometallurgy. The second section relates to methods of testing metals and discusses mechanical tests, corrosion tests, metallography, microscopy and macrography.

Part III discusses heat treatment and thermochemistry and Part IV is concerned with the metallurgy of iron. Metallurgy of nonferrous metals is the topic of the fifth part.

Dull Outlook Prevails for Second Quarter Steel

Scrap Slips Again; Tin Plate Cartel Cuts Export Price



■ STEEL buying shows no indication of gaining in volume.

Immediate prospects are for a continuation of the present rate of activity. Some observers believe the peak for first half has been reached, the early part of April being the highest point in production.

While inventories of steel consumers have been reduced materially, some having cleared their accumulations, a survey by sellers reveals that stocks are still large in the case of others. Continued absence of the various branches of the automotive industry from the market removes an important factor in demand and signs indicate little buying will be done for that outlet before mid-year. Agricultural implement manufacturers are approaching the time when production will be eased. Last year the absence of dealer stocks minimized this dip but this year stocks are much larger.

Much interest attaches to disposition of the 16 cargo ships for which the maritime commission will open bids early in May. This tonnage will be of importance to mills within reach of tidewater.

Slight changes in operations last week resulted in a net gain of half a point in the national rate, to 32.5 per cent. Adjustments to meet demand indicated no definite trend. Pittsburgh was 1 point lower at 29 per cent, New England 5 points lower at 25 per cent and St. Louis 6.1 points lower at 36.3 per cent. Chicago gained half a point to 30.5 per cent, Wheeling 13 points to 44, Buffalo 2 points to 30, Cincinnati 27 points to 45 and Cleveland 7.8 points to 30.8 per cent. There was no change at Detroit at 18 per cent, Birmingham 66, Youngstown 31 and Eastern Pennsylvania at 28.

International Tin Plate association, the tin plate cartel, has reduced the price for export business from the equivalent of about $5.62½ per base box to $5.04¾ per base box. This is a reduction of 57¾ cents per box. The cut is said to have been made to meet competition by an American producer, selling under the former cartel price. Meanwhile American tin plate makers have met severe competition in South American markets from German plate offered considerably under the American product.

Inquiry for 5000 freight cars by the Southern railway, requiring an estimated 80,850 tons of steel, is a high light in the railroad field. Bids will be opened April 30, thus offering possible early production. General Chemical Co., New York, is asking bids on seven to ten 70-ton covered hoppers and Pittsburgh Plate Glass Co. on one tank car. The Chilean State railway has awarded seven locomotives to Baldwin Locomotive works. Rail inquiry is being held back, although considerable tonnage seems imminent and badly needed. New York Central has postponed indefinitely rail buying program of 40,000 tons. Rail mills are nearing the end of present commitments, some seeing the end of their orders early in May. Lehigh Valley has permission to borrow $778,000 for repairs to equipment, including 1460 steel coal cars. Government loans to railroads may increase equipment buying, though present freight volume does not require more than present equipment.

Public projects furnish most structural tonnage, among large awards last week being 7000 tons for a trestle and 1200 tons for traveling cranes for Coulee Dam, 4500 tons for East river tunnel, New York and 2100 tons for an airplane hangar in New York state. Some 7000 tons are pending for Queens-Midtown tunnel, New York.

Labor interruptions in the automotive industry brought a smaller production of automobiles last week, the total being 60,563 units, compared with 62,021 the preceding week. General Motors production was 23,370 against 23,620 the week before; Chrysler 13,550 against 13,775; Ford 16,085 against 16,135 and others 7558 against 8491.

Further adjustment in scrap prices in Eastern Pennsylvania caused the composite for steelmaking grades to decline 17 cents further, to $12. While the situation is weak and nominal in practically all consuming centers an occasional advance is made when important buying is done. This indicates the decline is near the bottom and that tonnage buying would cause an upward movement. The iron and steel composite is 1 cent lower, at $38.58 and the finished steel composite is steady at $61.70.

COMPOSITE MARKET AVERAGES

	April 23	April 16	April 9	One Month Ago Mar., 1938	Three Months Ago Jan., 1938	One Year Ago Apr., 1937	Five Years Ago Apr., 1933
Iron and Steel	$38.58	$38.59	$38.62	$38.80	$38.95	$40.39	$27.78
Finished Steel	61.70	61.70	61.70	61.70	61.70	61.45	44.94
Steelworks Scrap..	12.00	12.17	12.63	13.20	13.85	21.27	7.23

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	April 23, 1938	March 1938	Jan. 1938	April 1937
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.45c
Steel bars, Chicago	2.50	2.50	2.50	2.50
Steel bars, Philadelphia	2.77	2.75	2.75	2.74
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.35
Shapes, Pittsburgh	2.25	2.25	2.25	2.25
Shapes, Philadelphia	2.465	2.465	2.465	2.455
Shapes, Chicago	2.30	2.30	2.30	2.30
Tank plates, Pittsburgh	2.25	2.25	2.25	2.25
Tank plates, Philadelphia	2.445	2.445	2.445	2.435
Tank plates, Chicago	2.30	2.30	2.30	2.30
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	3.15	3.15
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.80
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.50	2.50
Sheets, No. 24, hot anneal., Gary	3.25	3.25	3.25	3.25
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.90
Plain wire, Pittsburgh	2.90	2.90	2.90	2.90
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$5.25
Wire nails, Pittsburgh	2.75	2.75	2.75	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$37.00	$37.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	37.00	37.00
Billets, open-hearth, Pittsburgh	37.00	37.00	37.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	47.00	47.00	47.00	47.00

Pig Iron

	April 23, 1938	March 1938	Jan. 1938	April 1937
Bessemer, del. Pittsburgh	$25.34	$25.26	$25.26	$25.26
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern del. East. Pa.	25.34	25.34	25.34	25.26
No. 2 fdry., Pittsburgh	25.21	25.21	25.21	25.21
No. 2 fdry., Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	23.89	23.89	23.89	23.69
No. 2X eastern, del. Phila.	26.215	26.215	26.215	26.135
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	30.34	30.24	30.24	30.04
Gray forge, del. Pittsburgh	24.17	24.17	24.17	24.17
Ferromanganese, del. Pittsburgh	107.77	107.49	107.49	99.79

Scrap

Heavy melting steel, Pittsburgh	$12.25	$13.65	$14.05	$22.75
Heavy melt. steel, No. 2, E. Pa.	11.25	12.75	13.75	19.06
Heavy melting steel, Chicago	11.25	12.20	13.25	20.75
Rails for rolling, Chicago	15.25	15.25	14.90	23.35
Railroad steel specialties, Chicago	13.75	14.25	15.75	23.75

Coke

Connellsville, furnace, ovens	$4.25	$4.25	$4.25	$4.50
Connellsville, foundry, ovens	5.25	5.25	5.25	5.05
Chicago, by-product foundry, del.	11.00	11.00	11.00	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Subject to Quantity Extras and deductions (Except Galv.)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.76c
Philadelphia, del.	2.72c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pac. base pts. f.o.b. cars, dock,	2.95c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, delivered	3.51c
Philadelphia, del.	3.47c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pac. base pts. f.o.b. cars, dock,	3.80c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.12c
New York, delivered	4.16c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pac. base pts. f.o.b. cars, dock,	4.40c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.00c
Gary	3.10c
Detroit, delivered	3.20c
Philadelphia, del.	3.32c
New York, del.	3.36c
St. Louis, del.	3.23c
Granite City, Ill.	3.20c
Pac. base pts. f.o.b. cars, dock,	3.60c

Cold Rolled No. 20

Pittsburgh	3.45c
Gary	3.55c
Detroit, delivered	3.65c
Philadelphia, del.	3.77c
New York, del.	3.81c
St. Louis	3.68c
Granite City, Ill.	3.65c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Waste-waste, 2.80c; strip	2.50c
Long ternes, No. 24, unassorted, Pittsburgh	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.55c
Philadelphia, del.	2.44½c
Boston, delivered	2.68c
Buffalo, delivered	2.49½c
Chicago or Gary	2.30c
Cleveland, del.	2.45½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
St. Louis, delivered	2.54c
Pacific basing points, f.o.b. cars, dock,	2.80c
Do. floor plates	4.05c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46½c
New York, del.	2.52c
Boston, delivered	2.66c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo, delivered	2.37½c
Gulf Ports	2.66c
Birmingham	2.40c
St. Louis, del.	2.54c
Pacific coast basing pts., f.o.b. cars dock,	2.80c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Philadelphia, del.	2.77c
Boston, delivered	2.89c
New York, del.	2.81c
Pacific coast basing pts., f.o.b. cars, dock,	3.00c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo, delivered	2.37½c
Birmingham	2.45c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.67c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.45c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.50c
Gulf ports	2.85c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.77c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.30c
Chicago, Buffalo, Cleveland, Birm., Young.	2.35c
Gulf ports	2.70c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.15c
Galv. fence wire	3.55c
Woven wire fencing (base C. L. column)	.74
Single loop bale ties, (base C. L. column)	.63

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Galvanized wire	2.95c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	3.50c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	.0.70
2100	0.75	3200	.1.35
2300	1.55	3300	.3.80
2500	2.25	3400	.3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	0.15
6100 bars	1.20
6100 spring	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c
Pacific basing pts. f.o.b. cars, dock	3.05c

Strip and Hoops

(Base, hot-rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in. Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.72c
New York, del.	2.76c
Cooperage hoop, Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.41c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	4.30c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Car axles forged, Pitts., Chgo., B'ham.	3.35c
Tie plates, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger, to 1-in.	60-10 off
Do. 1¼ and 1¼-in.	60-5 off
Tire bolts	50 off

Stove Bolts

In packages with nuts attached 70 off; in packages with nuts separate 70-10 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to $\frac{7}{16}$-inch	60-10 off
Do., $\frac{7}{8}$ to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	70-5 off

Square Head Set Screws

Upset, 1-in., smaller	80-5 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
$\frac{7}{16}$-inch and smaller, Pitts., Chi., Cleve.	65-5 off

Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Cut Nails

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, do discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	59½	49
¼	62½	53
1—3	64½	55½

Iron

¼	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50
11 and 12	59½	49

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch lap weld	59½
12-inch, lap weld	58½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.89	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.94
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.80-58.80
6 to 24-in., Chicago	54.80-55.80
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

Rerolling Quality

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo, Young., Birm.	$37.00
Philadelphia	42.83
Duluth	39.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleveland, No. 5 to $\frac{9}{32}$-inch incl.	47.00
Do., over $\frac{9}{32}$ to $\frac{17}{64}$-in. incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.00- 4.50
Connellsville, fdry.	5.00- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.50
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.65

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Sulphate of ammonia	$29.50
Naphthalene flakes and balls, in bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. over or port

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	25.87	.....	.....	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.78	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	26.15	...	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95
St. Louis, northern	24.55	24.55	24.05	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	26.08	26.08	.....	26.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phil. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80
New Jersey	51.00

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$20.00
Do., for barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.77
Spiegeleisen, 19-21% dom. Palmerton, Pa., spot	33.00
Do., New Orleans	33.00
Do., 26-28%, Palmerton	39.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., ton lot	80.50
Do., 75 per cent	126.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.85-1.95
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod-plant, frt. all., net ton	142.50
Contract, ton lots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb. f.o.b. mill	0.95
Molybdate, lb. cont. f.o.b. mill	0.80
Technical molybdenum trioxide, 53 to 60% molybdenum, f.o.b. mill	0.80

†Carloads. Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper, Electro, del. Conn.	Copper, Lake, del. Midwest	Copper, Casting, refinery	Straits Tin, New York, Spot	Straits Tin, New York, Futures	Lead New York	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony American Spot, N. Y.	Nickel Cathodes
April 16	10.00	10.12½	9.52½	39.75	39.90	4.50	4.35	4.00	20.00	13.75	35.00
April 18	10.00	10.12½	9.52½	39.87½	40.00	4.50	4.35	4.15	20.00	13.75	25.00
April 19	10.00	10.12½	9.52½	38.87½	38.95	4.50	4.35	4.25	20.00	13.75	35.00
April 20	10.00	10.12½	9.52½	38.60	38.70	4.50	4.35	4.25	20.00	13.75	35.00
April 21	10.00	10.12½	9.52½	38.37½	38.50	4.50	4.35	4.25	20.00	13.75	35.00
April 22	10.00	10.12½	9.52½	38.65	38.80	4.50	4.35	4.25	20.00	13.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 10.00c Conn. copper

Sheets

Yellow brass (high)	16.37½
Copper, hot rolled	18.12½
Lead, cut to jobbers	7.75
Zinc, 100-lb base	9.75

Tubes

High, yellow brass	19.12½
Seamless copper	18.62½

Rods

High yellow brass	12.37½
Copper, hot rolled	14.62½

Anodes

Copper, untrimmed	15.37½

Wire

Yellow brass (high)	16.62½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

New York	5.65-5.90
*Cleveland	6.50-6.75
*Chicago	5.62½-5.87½
St. Louis	5.00-5.25

Heavy Copper and Wire

New York, No. 1	6.62½-6.87½
*Cleveland, No. 1	7.25-7.50
Chicago, No. 1	7.25-7.50
*St. Louis	6.75-7.00

Composition Brass Borings

New York	5.65-5.90

Light Copper

New York	4.62½-4.87½
*Cleveland	5.75-6.00
Chicago	5.25-5.50
*St. Louis	5.00-5.25

Light Brass

Cleveland	3.25-3.50
Chicago	3.37½-3.62½
*St. Louis	3.12½-3.37½

Lead

New York	3.50-3.75
Cleveland	3.25-3.50
Chicago	3.00-3.25
St. Louis	2.75-3.00

Zinc

New York	1.75-1.87½
Cleveland	1.75-2.00
*St. Louis	1.75-2.00

Aluminum

*Borings, Cleveland	4.00-4.25
Mixed cast, Cleve.	6.75-7.00
*Clips, soft, Cleve.	10.75-11.00
*Mixed cast, St. L.	7.25-7.50

SECONDARY METALS

Brass ingot, 85-5-5-5, lcl.	10.25
*Stand. No. 12 alum.	14.25-14.75

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-In. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled No. 10	Sheets Hot Roll Ann. No. 24	Sheets Galv. No. 24
Boston	4.26	4.46	5.46	4.11	4.10	5.76	4.21	4.96	5.00
New York (Metropolitan)	4.16	4.36	4.36	4.02	3.99	5.62	4.11	4.75	5.00
Philadelphia	4.03	4.13	4.63	3.92	3.92	5.25	4.03	4.65	4.90
Baltimore	4.00	4.20	4.45	3.90	3.90	5.50	3.95	4.50	4.70
Norfolk, Va.	4.20	4.40	4.65	4.10	4.10	5.70	4.15	4.75	5.40
Buffalo	3.90	4.25	4.25	3.95	3.80	5.55	4.00	4.83	5.38
Pittsburgh	3.80	4.00	4.00	3.70	3.70	5.30	3.75	4.50	5.15
Cleveland	3.75	4.19	4.19	3.89	3.89	5.49	3.94	4.69	5.34
Detroit	3.935	4.185	4.185	3.95	3.95	5.55	3.935	4.685	5.40
Cincinnati	4.09	4.29	4.29	3.99	3.99	5.59	4.04	4.79	5.44
Chicago	3.85	4.10	4.10	3.75	3.75	5.35	3.85	4.60	5.25
Minneapolis	4.10	4.35	4.35	4.00	4.00	5.60	4.10	4.75	5.00
Milwaukee	3.96	4.21	4.21	3.86	3.86	5.46	3.96	4.71	5.36
St. Louis	4.12	4.37	4.37	4.02	4.02	5.62	4.12	4.87	5.52
Kansas City	4.40	4.65	4.65	4.30	4.30	5.90	4.10	4.85	5.50
Memphis	4.35	4.55	4.55	4.25	4.25	5.91	4.30	5.05	5.70
Chattanooga	4 25	4.45	4.45	4.15	4.15	5.98	4.20	4.10	4.70
Tulsa, Okla.	4.89	5.14	5.14	4.79	4.79	6.39	4.89	5.64	6.29
Birmingham, Ala.	3.85	4.05	4.05	3.75	3.75	5.96	3.80	4.55	5.20
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	4.75	5.15
Houston, Tex.	3.75	6.15	6.55	4.25	4.25	6.15	4.50	5.25	5.65
Seattle	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.35	5.90
Portland, Oreg.	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.15	5.90
Los Angeles	4.30	4.80	6.55	4.30	4.30	6.20	4.50	5.00	5.25
San Francisco	4.20	4.80	6.50	4.05	4.05	5.55	4.30	5.15	5.55

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.86	4.71	4.56	8.00	6.55	6.30	8.40	9.02	7.57
New York	3.96	4.61	4.36	7.84	6.39	6.14	9.54	9.04	7.59
Philadelphia	3.88	4.56	4.28	7.81	6.36	6.11	9.01	....	....
Baltimore	....	4.50	4.15	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.82	4.35	4.10	7.60	6.15	5.90	8.00	8.60	8.15
Pittsburgh	....	4.15	3.95	7.70	6.25	8.50	9.10	8.70	7.25
Cleveland	3.60	4.30	3.95	7.78	6.33	6.33	8.18	8.60	7.15
Detroit	3.78	4.30	4.085	7.89	6.44	6.19	7.74	8.88	7.43
Cincinnati	....	4.54	4.10	7.94	6.49	6.24	9.34	8.95	7.50
Chicago	3.91	4.30	4.05	7.60	6.15	5.90	8.00	8.60	7.15
Minneapolis	....	4.83	4.25	7.95	6.50	9.03	9.63	9.23	7.78
Milwaukee	....	4.41	4.16	7.81	6.36	6.11	8.21	8.81	7.36
St. Louis	4.01	4.57	4.32	7.97	6.52	6.27	8.37	8.97	7.52
Kansas City	4.37	4.79	....	....	....	....	....	....	....
Memphis	....	4.86	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.34	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.85	6.05	....	8.00	8.00	8.65	....	....
Portland, Oreg.	....	5.85	5.85	9.00	8.00	7.85	8.70	....	....
Los Angeles	5.96	6.85	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	9.30	6.80	5.20	9.65	8.80	8.65	9.30	10.65	9.80

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, April 21

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental & North Sea ports, gross tons: Quoted in dollars at current value	Continental & North Sea ports, gross tons: **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$27.45 5 10 0	$18.49	2 6 0
Basic bessemer	....	....	....
Hematite, Phos. .03-.05	32.44 6 10 0*	17.89	2 4 6
Billets	$39.30 7 17 6	$43.22	5 7 6
Wire rods, No. 5 gage	56.26 11 5 6	39.17	4 17 6
Standard rails	$50.52 10 2 6	$46.23	5 15 0
Merchant bars	2.62c 11 15 0	1.90c	5 5 0
Structural shapes	2.37c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.58c 11 11 3	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.12c 14 0 0	2.82c	7 15 0°
Sheets, gal., 24 ga., corr.	3.72c 16 15 0	3.45c	9 10 0
Bands and strips	2.95c 13 5 0	1.73c	4 15 0
Plain wire, base	4.35c 19 10 0	2.23c to 2.64c	6 2 6 to 7 5 0
Galvanized wire, base	5.18c 23 5 0	2.85c to 2.95c	7 17 6 to 8 2 6
Wire nails, base	4.13c 18 10 0	2.54c to 2.72c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 5.61 1 2 6	....	....

British ferromanganese $102.50 delivered Atlantic seaboard, duty-paid

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$27.30 5 9 0(a)	$17.69	563.50	$19.60	580	$25.36	63
Basic bess. pig iron	24.95 5 0 0(a)	.....	....	.....	....	27.98	(b)69.50
Furnace coke	8.11 1 12 6	5.93	189	7.27	215	7.65	19
Billets	39.30 7 17 6	26.38	840	29.07	860	38.85	96.50
Standard rails	2.26c 10 2 6	1.61c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.55c 11 9 0	1.51c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.46c 11 0 6	1.48c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.61c 11 14 3	1.89c	1,350	2.06c	1,375	2.29c	127
Sheets, black	3.51c 15 15 0§	2.19c	1,565‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.13c 18 10 0	3.15c	2,250	4.50c	3,000	6.66c	370
Plain wire	4.35c 19 10 0	2.32c	1,660	2.48c	1,650	3.11c	173
Bands and strips	2.72c 12 4 0	1.69c	1,210	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed.

**Gold pound sterling carries a premium of 64.1 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	10.00
Birmingham, No. 2	9.00
Bos. dock No. 1 exp.	11.50
N. Eng. del. No. 1	12.00
Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1	11.00-11.50
Cincinnati	8.50- 9.00
Cleveland, No. 1	11.00-11.50
Cleveland, No. 2	10.00-10.50
Detroit, No. 1	6.50- 7.00
Eastern Pa., No. 1	12.50-13.00
Eastern Pa., No. 2	11.00-11.50
Federal, Ill.	9.50-10.00
Granite City, R. R.	10.50-11.00
Granite City, No. 2	9.50-10.00
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.00-12.50
New York, No. 1	†10.00
N. Y. dock No. 1 exp.	11.50
Pitts., No. 1 (R. R.)	14.00-14.50
Pitts., No. 1 (dlr.)	12.00-12.50
Pittsburgh, No. 2	11.00-11.50
St. Louis, R. R.	10.50-11.00
St. Louis, No. 2	9.50-10.00
San Francisco, No. 1	12.00
Seattle, No. 1	12.00
Toronto, dlrs. No. 1	10.00
Valleys, No. 1	12.00-12.50

COMPRESSED SHEETS

Buffalo	9.50-10.00
Chicago, factory	10.00-10.50
Chicago, dealer	9.50-10.00
Cleveland	10.50-11.00
Detroit	8.00- 8.50
E. Pa., new mat.	13.00-13.50
E. Pa., old mat.	9.00- 9.50
Los Angeles	12.50-13.00
Pittsburgh	12.00-12.50
St. Louis	6.00- 6.50
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo, new	10.50-11.00
Buffalo, old	8.50- 9.00
Cincinnati, del.	7.75- 8.25
Cleveland	7.50- 8.00
Los Angeles	11.00-11.50
Pittsburgh	11.00-11.50
St. Louis	5.25- 5.75
Toronto, dealers	7.00

SHEET CLIPPINGS, LOOSE

Chicago	7.00- 7.50
Cincinnati	4.25- 4.75
Detroit	4.75- 5.25
†Los Angeles	3.75- 4.00
St. Louis	4.00- 4.50

STEEL RAILS, SHORT

Birmingham	15.00
Buffalo	16.50-17.00
Chicago (3 ft.)	14.50-15.00
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	15.50-16.00
Detroit	13.50-14.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	17.25-17.75
St. Louis, 2 ft. & less	14.00-14.50

STEEL RAILS, SCRAP

Boston district	†10.00
Buffalo	13.50-14.00
Chicago	11.00-11.50
Cleveland	16.00-16.50
Pittsburgh	15.00-15.50
St. Louis	11.50-12.00
Seattle	10.00

STOVE PLATE

Birmingham	8.00- 8.50
Boston district	†8.00
Buffalo	11.00-11.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.25- 5.50
Detroit, net	7.50- 8.00
Eastern Pa.	11.50-12.00
New York, fdry.	†7.50
St. Louis	6.75- 7.25
Toronto, deal'rs, net	9.00

SPRINGS

Buffalo	15.00-15.50
Chicago, coil	15.00-15.50
Chicago, leaf	14.00-14.50
Eastern Pa.	16.50-17.00
Pittsburgh	16.50-17.00
St. Louis	13.00-13.50

ANGLE BARS—STEEL

Chicago	13.50-14.00
St. Louis	11.75-12.25

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, crops	16.00-17.00
Cleveland, crops	19.50-20.50
Eastern Pa., crops	17.00-17.50
Pittsburgh, crops	16.50-17.50

FROGS, SWITCHES

Chicago	11.00-11.50
St. Louis, cut	11.25-11.75

SHOVELING STEEL

Federal, Ill.	9.50-10.00
Granite City, Ill.	9.50-10.00
Los Angeles	15.00-16.50
Toronto, dealers	8.00

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Chicago, No. 1 net	8.50- 9.00
Cincinnati, No. 2	8.25- 8.75
Eastern Pa., No. 1	13.50-14.00
St. Louis, No. 1	8.00- 8.50
St. Louis, No. 2	9.75-10.25
Toronto, No. 1 dlr.	16.00

SPECIFICATION PIPE

Eastern Pa.	14.00-14.50
New York	†9.00- 9.50

BUSHELING

Buffalo, No. 1	9.50-10.00
Chicago, No. 1	10.00-10.50
Cincin., No. 1, deal.	6.75- 7.25
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	6.50- 7.00
Detroit, No. 1, new	6.25- 6.75
Valleys, new, No. 1	10.00-10.50
Toronto, dealers	7.00

MACHINE TURNINGS (Long)

Birmingham	6.00- 7.00
Buffalo	5.50- 6.00
Chicago	4.50- 5.00
Cincinnati, dealers	2.50- 3.00
Cleveland	6.50- 7.00
Detroit	3.25- 3.75
Eastern Pa.	6.50
Los Angeles	4.00- 4.25
New York	†3.50
Pittsburgh	6.50- 7.00
St. Louis	3.00- 3.50
Toronto, dealers	7.00
Valleys	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	1.25
Buffalo	5.50- 6.00
Cincinnati, dealers	2.00- 2.50
Cleveland	6.50- 7.00
Eastern Pa.	6.00- 6.50
Detroit	3.75- 4.25
New York	†2.50- 3.00
Pittsburgh	6.00- 6.50
Toronto, dealers	7.50

CAST IRON BORINGS

Birmingham	6.00- 7.00
Boston dist. chem.	†6.00
Bos. dist. for mills	†6.00
Buffalo	5.50- 6.00
Chicago	4.50- 5.00
Cincinnati, dealers	2.00- 2.50
Cleveland	6.50- 7.00
Detroit	3.75- 4.25
E. Pa., chemical	10.00-11.00
New York	†3.50-4.00
St. Louis	3.00- 3.50
Toronto, dealers	7.50

PIPE AND FLUES

Cincinnati, dealers	5.25- 5.75
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.75- 6.25
Eastern Pa.	11.50-12.00
New York	†8.00
St. Louis	7.50- 8.00

FORGE FLASHINGS

Boston district	†6.25
Buffalo	9.50-10.00
Cleveland	10.50-11.00
Detroit	5.75- 6.25
Los Angeles	9.00
Pittsburgh	11.00-11.50

FORGE SCRAP

Boston district	†6.25
Chicago, heavy	14.50-15.00

ARCH BARS, TRANSOMS

St. Louis	13.00-13.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	10.00-10.50
Chicago, elec. fur.	10.50-11.00
Eastern Pa.	11.00-11.50
St. Louis	8.00- 8.50
Toronto	8.00

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	16.00-16.50
Boston district	†14.00
Chicago, net	16.00-16.50
Eastern Pa.	21.50-22.50
St. Louis	17.00-17.50

SHAFTING

Boston district	†13.00-13.50
New York	†14.50-15.00
Eastern Pa.	18.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron	†10.00
Buffalo, steel	15.00-15.50
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.00-14.50
Cincinnati, iron	13.00-13.50
Eastern Pa., iron	14.50-15.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	16.50-17.00
St. Louis, iron	11.50-12.00
St. Louis, steel	13.00-13.50

NO. 1 CAST SCRAP

Birmingham	14.00-14.50
Boston, No. 1 mach.	†10.00
N. Eng. del. No. 2	11.50
N. Eng. del. textile	14.00-14.50
Buffalo, cupola	13.00-13.50
Buffalo, mach.	13.50-14.00
Chicago, agri. net	10.00-10.50
Chicago, auto	11.00-11.50
Chicago, railr'd net	10.00-10.50
Chicago, mach. net	11.00-11.50
Cincin., mach. cup.	10.25-10.75
Cleveland, mach.	17.00-17.50
Eastern Pa., cupola	15.00
E. Pa., mixed yard	12.50-13.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, No. 1	11.25-11.75
St. L., No. 1, mach.	12.75-13.25
Toronto, No. 1, mach., net	12.50

HEAVY CAST

Boston dist. break.	†8.25- 8.50
New England, del.	11.50
Buffalo, break.	10.50-11.00
Cleveland, break.	14.00-15.00
Detroit, break.	10.00-10.50
Detroit, auto net	11.00-11.50
Eastern Pa.	13.50-14.00
Los Ang., auto, net	13.00-13.50
New York, break.	†9.50-10.00
Pittsburgh, break.	11.75-12.25

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del.	16.00
Buffalo	13.00-13.50
Chicago, R. R.	12.50-13.00
Cincin., agri. del.	9.75-10.25
Cleveland, rail	15.50-16.00
Detroit, auto	10.00-10.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	10.50-11.00

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†11.00
Chicago	15.00-15.50
Eastern Pa.	16.50-17.00
New York	†14.50-15.00
St. Louis	13.25-13.75

LOCOMOTIVE TIRES

Chicago (cut)	14.00-14.50
St. Louis, No. 1	12.50-13.00

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	13.50-14.00
Eastern Pa.	17.00-17.50
Pitts. (light & hvy.)	16.50-17.50
Seattle	15.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00-13.00
No. Afr. low phos.	nominal
Swedish low phos.	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom.	12.00
Tungsten, sh. ton unit, duty paid nom.	21.00-22.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.50-26.50
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	nom. 45.00
So. African, 50-52%	nom. 45.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 84

Pittsburgh—Although about the same number of orders have been received for sheets, the tonnage is somewhat less and orders are still widely spread. The production rate is estimated at 34 per cent of capacity, with galvanized sheets at 36 per cent. These figures are both slightly lower than last week as production is being balanced with the rate of incoming orders.

Chicago—Sheet demand has leveled off and business fails to better the March rate. The automotive industry is furnishing little support to sheet production, best outlets being miscellaneous users and warehouses. Requirements of the farm equipment industry remain relatively heavy but a seasonal letdown is in early prospect.

Cleveland—Inventories of local stamping concerns and other miscellaneous consumers appear to have reached new low levels as an increasing number are buying small tonnages for actual needs. Some sellers report volume of new business while limited to the normally light consumers, should continue to show improvement throughout April. Prices are unchanged.

New York—Sheet business shows little variation from the relatively low rate that has prevailed over recent weeks. Compared with a month ago volume is perhaps less, however. Specifications from the building trades and from manufacturers of low price stoves are still outstanding.

Boston—Except for some scattered gains in blue annealed sheet demand, sheet buying has flattened and is centered mostly in small lots for miscellaneous consumption. Tack plate, a hot-rolled sheet, is an important item in this district, but due to substantial inventories held by most tackmakers, buying is light. About 40 per cent of the tack business of the country is in New England. Most consumers bought heavily months back. Galvanized finishes are less active after a mild flurry.

Cincinnati—Buying of sheets fails to improve, sporadic gains earlier this month having disappeared. Greatest handicap to tonnage is lack of customary expansion in seasonal lines, such as stoves, refrigerators and automobiles. Jobbing demand continues fairly steady. Prices in this district are stable, in contradiction to rumors.

Philadelphia — Requirements of the building trade for galvanized sheet primarily, dominate sheet

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Armstrong's high temperature insulation engineers will gladly assist you in the selection of proper materials and their application. In addition, Armstrong's Central Technical Laboratory is available for research on unusual problems. For engineers wishing to make open specifications for high temperature insulation, Armstrong will be pleased to furnish complete specifications outlining the standards required for the different physical characteristics with permissible tolerances. Write today for your free sample of Coprtex and a copy of the above booklet. Armstrong Cork Products Company, Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.

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2. Low lineal shrinkage
3. Superior insulating efficiency
4. High modulus of rupture
5. Will accommodate rivet heads
6. Light in weight
7. Available in special shapes
8. Reasonably priced
9. Cement reclaimable in case of repairs
10. Cement has unusual stickability
11. Cement is easy to apply

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HIGH TEMPERATURE INSULATION
INSULATING FIRE BRICK · HIGH TEMPERATURE BLOCK
PLASTIC CEMENTS · DIATOMACEOUS EARTHS

business here. However, a leading district radio manufacturer is specifying more freely than in some time, taking electrical sheets and cold-rolled and hot-rolled pickled grades. Fair tonnages are coming out from jobbers, who, in turn, are meeting a substantial portion of the building demands and supplying hand-to-mouth requirements of a number of manufacturing consumers, who normally would rely largely upon mills.

Buffalo—Sheet buying is further curtailed by labor trouble in automotive plants at Detroit. Releases from motor makers have fallen below the previous week. A light flow of miscellaneous orders continues as the main prop under the market. Galvanized sheets are in the best demand. Mills are restricting operations to keep in stride with orders, giving prompt shipment.

Birmingham, Ala.—While there has been no perceptible dropping off in specifications for sheets, available business has been for several weeks in small and scattered lots. Roofing continues to lag and manufacturers' sheets supply the backbone of the demand locally.

St. Louis—Sheet sales fail to show broadening tendencies, though current volume is about steady. Miscellaneous demands predominate, and some branches of the general manufacturing trade are running out of stock and replenishing on a necessity basis. Galvanized material is moving fairly well, mainly to industrial users. The leading local producer took off one open hearth this week, owing to lack of business.

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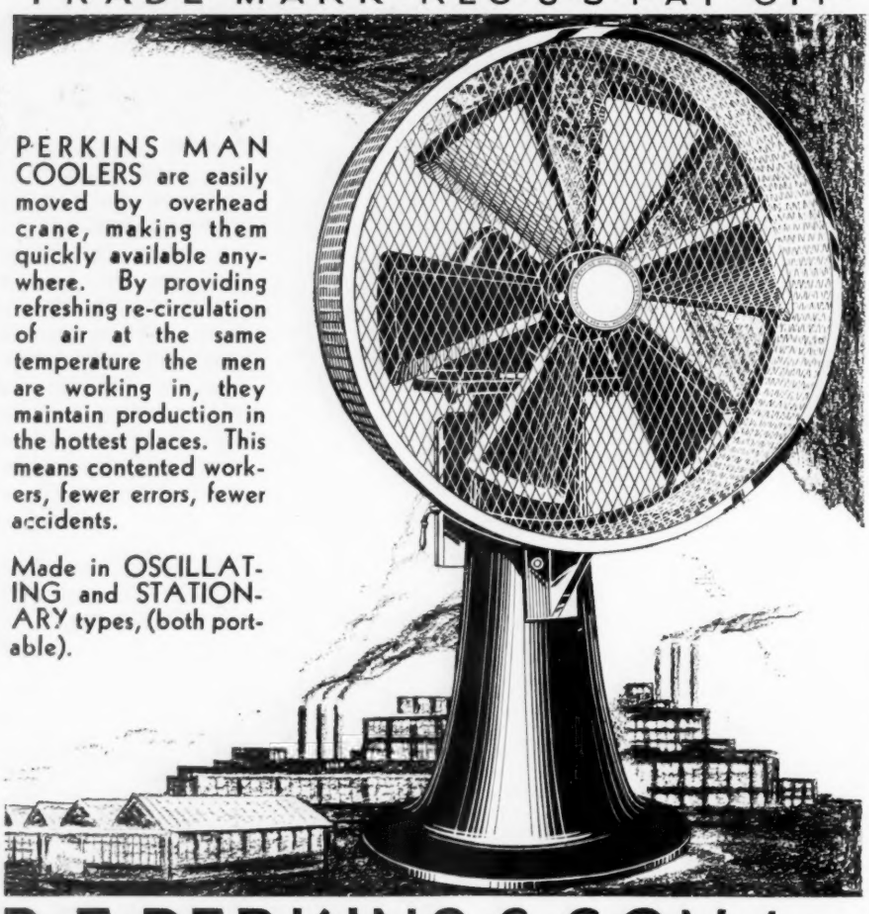

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Made in OSCILLATING and STATIONARY types, (both portable).

B.F. PERKINS & SON, *Inc.*
Engineers and Manufacturers
HOLYOKE · MASSACHUSETTS

Strip

Strip Prices, Page 85

Cleveland—Demand for hot and cold-rolled strip remains substantially unchanged with failure of auto partsmakers to increase specifications. Current needs are limited to miscellaneous tonnages from small stamping concerns serving household equipment manufacturers. Prices are unchanged.

Pittsburgh—Strip production has dropped slightly in both hot and cold-rolled divisions. Figures are still close to 20 per cent, however. Orders are widely scattered and for small tonnages.

Chicago—Strip demand is lighter in some directions and April business to date is failing to exceed the volume a month ago, when activity reached its best level for the year. The automotive industry still is buying little, demand from that direction being relatively lighter than from miscellaneous groups.

Philadelphia—Narrow strip business includes improved radio specifications, but demand continues light for both hot and cold-rolled grades. Prices are steady.

Boston—Spotty improvement in narrow cold strip buying, which developed earlier this month, is not being fully maintained. Having filled gaps in stocks at that time, low consumer operations with sizable banks of finished goods or parts, hold back orders. The ratio of buying by most small consumers is relatively better than by the larger using industries, lack of demand by the automobile trade being keenly felt.

New York—With one or two exceptions, producers of narrow cold strip are taking in less tonnage or barely holding to the recent slow rate. Finishing operations are spotty and average close to 30-35 per cent. Some users are apparently going to extremes in reducing inventories and stocks are broken badly in numerous instances.

Birmingham, Ala.—Strip is in

virtually no demand and will remain so, it is indicated, until a new season for cotton ties gets under way.

Plates

Plate Prices, Page 84

Chicago—Possibility of better plate demand from railroads is thought likely to materialize in the event substantial loans are made by the government for equipment building. Recent plate business from the carriers has consisted of small lots for routine repairs, with little tonnage moving for new freight car building. Miscellaneous plate buying continues slow and demand from structural fabricators shows no improvement.

New York—Plate sellers are looking for early issuance of the inquiry for 30 steel scows, recently noted as under contemplation by the city department of purchases, requiring several thousand tons of plates. This, combined with the 16 cargo ships previously noted as up for bids soon, represents the most promising work in sight. Oil company buying cotinues to taper and miscellaneous demands generally are light. Specifications for domestic fuel oil tanks have not yet appeared in any volume.

Cleveland — Plate requirements here are substantially unchanged. Due to absence of demand from the railroads and structural projects, present demand is restricted to small miscellaneous tonnage for plant equipment and the like. Prices are unchanged.

Philadelphia—Pending shipwork is the most promising feature of the local plate market, although it is believed it will take some time for this business to unfold. District plate makers are encouraged also over the issuance of the Southern Railway inquiry for 5000 freight cars, but believe that much of the tonnage which may ultimately be bought will go to southern mills. Meanwhile, business is decidedly spotty, with the award of 175 tons of plates by the Baldwin Locomotive Works for its Chilean locomotive order one of the few outstanding items.

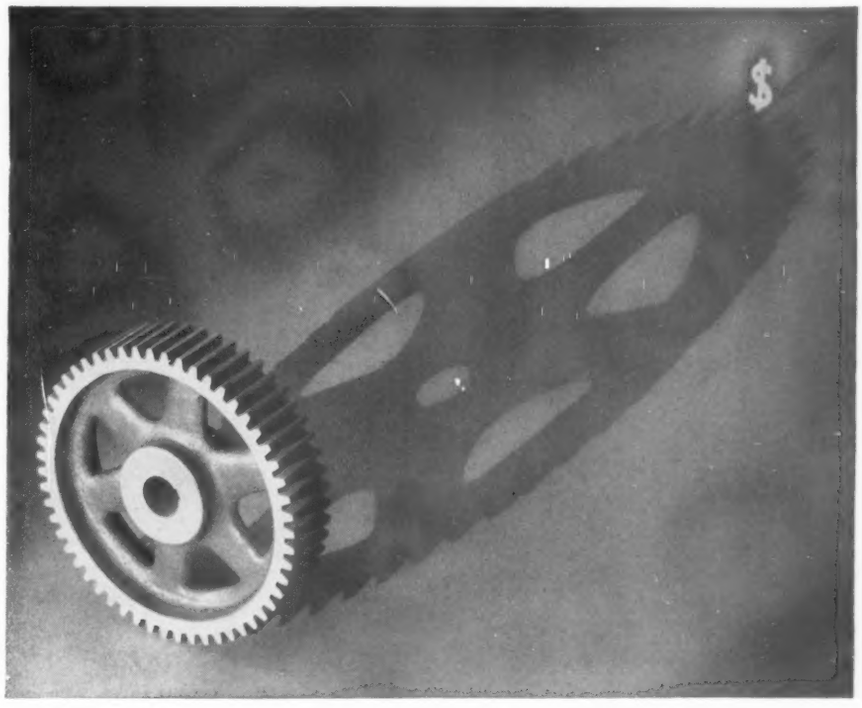
Boston—Plate buying continues in small lots, gas station oil tank requirements, 550 and 1000-gallon units, leading, with steady releases for shipyard needs. Railroad, boiler and structural shop releases are small and irregular. Specified work is not impressive. Hodge Boiler Works, Boston, will fabricate a fuel oil tank, army base, Boston. Pulp mill buying is slack, few digesters being contemplated. Floor plates move slowly. While there is no open shading on universal plates, extras are sometimes waived.

Birmingham, Ala.—Small and rather scarce business in plates is reported although the aggregate, by virtue of this scattered business, is comparatively satisfactory.

Seattle—Inquiry is slow and no large projects are up for figures. Shops have some tank and boiler work in hand but the volume is less than a year ago. Construction of two fish reduction plants at Grays Harbor, Wash., is expected to include contracts for a number of large tanks and retorts. Bids have been opened at Missoula, Mont., for 250 tons of culvert pipe for the forestry service.

Plate Contracts Placed

Unstated tonnage, two welded steel tanks, Aberdeen Proving grounds, Maryland, to Pittsburgh-Des Moines Steel Co., Pittsburgh; bids April 15; to be erected on foundations built by government.



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Bars

Bar Prices, Page 84

Cleveland—Demand for commercial and alloy carbon steel bars has failed to register expected improvement. This is attributed primarily to the absence of releases from automotive parts suppliers. Some sellers now believe there will be no substantial buying from this source until work on 1939 models begins. Mill operations are irregular, in step with incoming business, originating for the most part from farm and road equipment concerns.

Chicago — While bar demand is fairly well sustained, sales show no improvement compared with March and tendency is downward slightly. The farm equipment industry, though continuing a relatively active consumer, is entering a period in which operations normally decline. Little business is coming from the automotive industry.

New York—Bar specifications are holding their own, with releases from bolt and nut makers showing little variation. Jobber specifications are less active, but this is offset in a measure by better movement of cold-drawn bars for armaments, several fair-sized orders having been noted recently for shipment to various arsenals. Railroad outlook is a shade more encouraging with the Lehigh Valley likely to enter the market soon for materials for repairs to about 1500 coal cars.

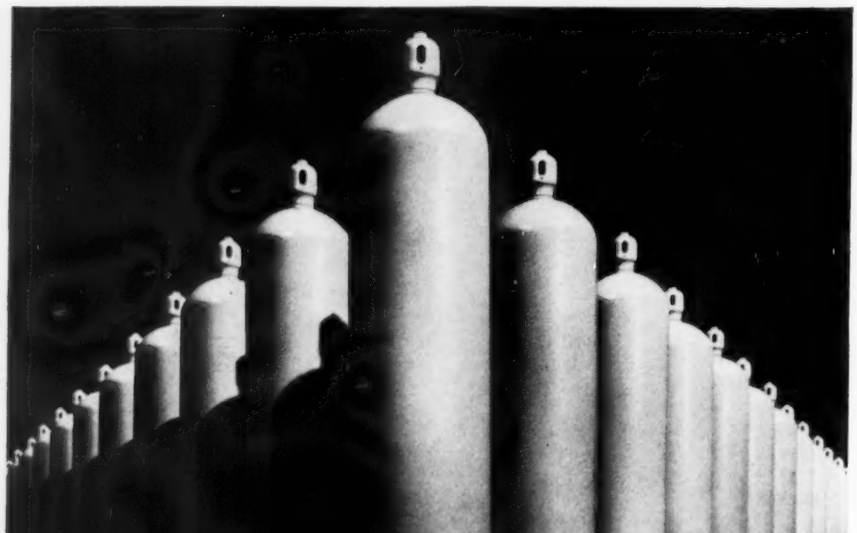
Pittsburgh — Demand for steel bars has dropped slightly, with orders running somewhat behind last week. No activity on manufacturing programs is anticipated and only a few small automotive releases have been received.

Philadelphia — Specifications from agricultural implement manufacturers feature the local bar market, with releases from jobbers, who, in turn, are in receipt of tonnage from buyers who normally buy from mills. This reflects the small, rush character of business, consumers for the most part covering only on immediate needs and demanding prompt shipment.

Birmingham, Ala.—Business in bars is not up to expectations for this season, but as in other specifications, scattering business from various sources keeps production at a fairly even rate.

Boston—Except for chain-making for the Boston navy yard demand for alloy steel bars has tapered. Low steel inventories are offset by substantial banks of finished goods by bolt and nut producers, slow liquidation of which retards new bar buying. Forging shop requirements are spotty, at least one supplying the airplane industry is fairly active. Marine hardware shops are still making the best showing, mostly in the Maine area.

All eight bidders on 128 tons of nickel-steel bars bid $11,820.50, delivered, Boston navy yard, April 19, the contract to be awarded by lot. Material is for chain-making.



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European Tin Plate Cartel Reduces Price

New York—International Tin Plate association (tin plate cartel) decided unanimously April 21 at its meeting in Cologne, Germany, to reduce the price for new business to a basis of 20s 3d. All members were in favor of continuing the cartel.

The current quotation on British tin plate was 22s 6d, for I. C. 20 x 14, f.o.b. Channel ports. This price at current exchange around $5 to the pound sterling was equal to $5.62½. The cartel's reduced price of 20s 3d means a new price of $5.04¾, a cut of 57¾ cents per box.

The understanding in the export trade here is that the cut was due

to certain American mills offering tin plate abroad at a figure below the cartel's former base price.

Meanwhile, American tin plate makers which have been selling to South America, have found German-made tin plate offered below the American price. This especially upset American trade to Argentina.

Pipe

Pipe Prices, Page 85

Chicago—Occasional gains are shown in cast pipe inquiries, but with small lots predominating, total pending business is slow to expand. Most prospective business is for smaller municipalities, few inquiries appearing from larger cities. Chicago is in the market for 268 tons of 24-inch pipe and fittings.

Pittsburgh—All lines of pipe and tubular goods continue quiet, with the recent activity, in oil country tubing almost completely subsided. Tonnages of oil country goods being sold are mostly for replacement and small feeder lines, with no major projects in the market. Standard pipe is quiet, and although some construction activity has been noted in the southwest, most sections of the country are taking only small tonnages.

Cleveland—A slight easing in cast iron pipe requirements has been noted. However, a small increase in PWA activity is expected soon. Gallagher & O'Horo, Youngstown, O., have been awarded 175 tons of steel pipe for a new water distribution system at Dillonvale, O. It is reported the city of Toledo, O., will ask for bids shortly on considerable tonnage of cast pipe for water works improvement. Prices are unchanged.

Boston—Cast pipe shipments are heavier, releases against old orders being sustained with a slight decline in new buying. Framingham, Mass., has bids on 200 tons and close to 2500 tons, the largest inquiry in several years, is expected out shortly for a water line, Cape Cod. Utilities buy little, mostly fittings. Steel pipe buying through re-sellers is fairly steady, but in small lots per order. Highway contractors have more work requiring miscellaneous cast and metal culvert pipe.

New York—Cast pipe buying has improved, 1500 tons being bought in this district, including contractors' lettings at Massapequa and Thiells, N. Y., and Bayonne, N. J. Part of 4500 tons for the Philippines has been placed with American foundries through a Manila bidder. New York is expected to inquire for close to 3000 tons, 8 and 12-inch early in May. Inquiry is featured by 320 tons for a Northern New Jersey water company.

Resale prices on commercial pipe are unsettled with a slight seasonal improvement tending to intensify competition. So far pipe mills have resisted pressure from jobbers for added discounts.

Seattle—WPA appropriations for a number of water system improvements have been approved and inquiry for cast iron goods is expected to increase within 30 days. Business pending now totals about 700 tons.

Birmingham, Ala. — Birmingham pipe plants report a slackening in miscellaneous business, but are fairly confident, based on current inquiries, government spending will lend some stability to production. American Cast Iron Pipe Co. is completing a large order for Corpus Christi, Tex., and reports nothing worthwhile in sight at the moment. Operations continue generally at three days a week.

San Francisco — Activity in cast iron pipe continues quiet with little

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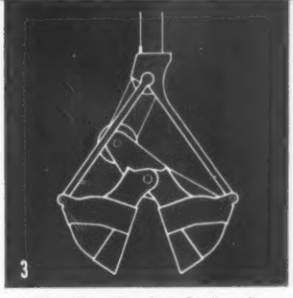
1 Granulated B. F. Slag, comparatively easy digging, permitting use of Blaw-Knox POWER WHEEL BUCKETS with large, hardened, slow-moving bearings—principally a maintenance problem.

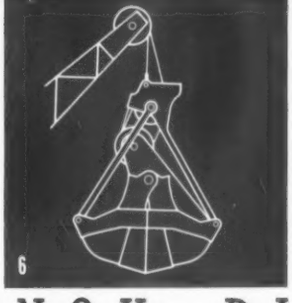
2 Blaw-Knox ORE BUCKETS four-rope type, low height for high storage, anti-friction sheave bearings—exceptional digging qualities developing 1 to 1 ratio or better.


3 Blaw-Knox Two Line Buckets for hard digging; built at weights suitable for handling O. H. slag, limestone, Spiegel, Ferro Mang., pig iron. Adaptable to overhead cranes and locomotive cranes.

4 When "hook-on" operation is necessary, much is gained by using Blaw-Knox 2 line type hook-on buckets. Especially suited to O. H. cinder yard service where 2 hooks are usually available.

5 Blaw-Knox Single Line "Hook-On" Buckets. Heavily built for O. H. service and medium weight types for handling roll scale, also for handling clay and other materials in O. H. Ladle House.

6 Blaw-Knox Two Line Buckets for locomotive cranes built at various weights to suit operating requirements including medium weight types adaptable to broad range of service.



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new business in sight. Only award of size went to United States Pipe & Foundry Co. and involved 153 tons of 6-inch pipe for Whittier, Calif. Pending business includes 383 tons of 8-inch pipe for San Francisco, 280 tons of 3 to 12-inch pipe for Yakima, Wash., and 150 tons of 18-inch pipe for Redding, Calif.

Cast Pipe Placed

450 tons, 6-inch, Massapequa, N. Y., to R. D. Wood & Co., Florence, N. J.
420 tons, 12-inch and fittings, water main, dock terminal, Bayonne, N. J., to United States Pipe & Foundry Co., Burlington, N. J.
400 tons, mostly 6-inch, water line, state project, Thiells, N. Y., to Warren Foundry & Pipe Co., Phillipsburg, N. J.
175 tons, 4 to 8-inch, new water distribution system, Dillonvale, O., to Gallagher & O'Horo, Youngstown, O.
153 tons, 6-inch, Whittier, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

320 tons, various sizes, Hackensack, N. J., water company; bids in.
268 tons, 24-inch pipe and fittings, Chicago; bids April 27.
200 tons, 8-inch, Queen Anne hill extension, Seattle; N. Coluccio, Seattle, low.
200 tons, 6, 8 and 12-inch, Framingham, Mass.; bids in.
100 tons, 12 and 20-inch, White Plains, N. Y.; bids in.
Unstated tonnage, improvements at Browning, Mont.; John O'Connor, Columbia Falls, Mont., general contractor.

Steel Pipe Pending

Unstated tonnage, 55 sections, each 20 feet long, 24-inch o.d., one-quarter inch plate, U. S. engineer, Memphis, Tenn.; bids April 28, cir. 257.

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Wire

Wire Prices, Page 85

Chicago—The trend in wire sales is sidewise and April business is expected to show slight change from that of March. With little prospect of rising demand last month's activity is thought likely to mark the first half peak. Consumption among most users is steady and with inventories low, buying in small lots is fairly frequent. Seasonal improvement in needs of the automotive industry has failed to appear. Stocks of distributors of merchant wire products have been increased moderately and future business in that direction is expected to be regulated according to sales of jobbers and dealers.

Pittsburgh—Mill schedules on woven wire fence and merchant wire products are catching up to orders and it appears evident the season for farm buying is near its close. Orders are down somewhat from previous weeks, although the backlog has been sufficient to keep mill operations at the same point. Manufacturing programs do not appear to hold promise for greater tonnages in manufacturers' wire and automotive needs have been slight.

Cleveland—Demand for merchant wire products continues the present bright factor. In spite of the fact the peak in merchant wire sales was reached some weeks ago the decline since that period has been less severe than many sellers anticipated. Sales of manufacturers' wire are light.

New York—Slight improvement in wire buying is noted by larger producers. Manufacturers' and round wires are moving a shade better. Spring wire to the furniture trade is moving moderately well, but this item is suffering from lack of demand for automobile assembly. Cable and electrical goods are slow, utilities buying sparingly. In spots a mild improvement is experienced for wire rope. Specialties in small lots cover a wider field.

wire rope. Specialties in small lots cover a wider field.

Boston—More fill-in orders for a greater number of products are sustaining incoming wire volume in the absence of buying by larger consuming industries, notably automobile and textile. Demand for manufacturers' wire and a broader list of specialties is a shade better, reflecting more gaps in consumer inventories which are being filled.

Birmingham, Ala.—Wire products are, according to local mill interests, just holding their own. Expectations were that spot business would have been heavier at this season.

Rails, Cars

Track Material Prices, Page 85

Southern Railway has put out the largest car inquiry in many months, asking bids on 5000 cars of various types, which will require about 80,850 tons of steel, including wheels and axles.

Some other car inquiry for a few cars each are also current but in general roads are not in the market. Chilean State railway has placed seven locomotives with Baldwin Locomotive Works.

New York Central has postponed indefinitely its rail purchasing program, according to reliable information. As much as 40,000 tons was under consideration earlier in the spring.

Locomotives Placed

Chilean State Railways, seven 4-8-2 locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

Locomotives Pending

City Light department, Seattle; one 35-ton diesel locomotive for Skagit river power project; bids soon; $20,000 available.

Buses Booked

American Car & Foundry Motors Co., New York: Seven 35-passenger for Eastern Michigan Motorbuses, Detroit; four 36-passenger for Baltimore Transit Co., Baltimore; two 36-passenger for August Bingler, North Haledon, N. J.; one 35-passenger for Collacutt Coach Lines, Oshawa, Ont.; one 31-passenger for Citizens Rapid Transit Co., Alexandria, Va.

Twin Coach Co., Kent, O.; Twenty-five 27-passenger for Cleveland Railway Co., Cleveland; five 23-passenger and nine 30-passenger for San Jose railroads, San Jose, Calif.; ten 41-passenger for Railway Equipment & Realty Co., Oakland, Calif.; four 23-passenger for Arkansas Power & Light Co., Little Rock, Ark.; three 30-passenger for Valley Motor Transit Co., East Liverpool, O.

Car Orders Pending

Southern railway, 5000 freight cars, bids April 30; includes 3000 steel sheathed box cars, 1000 high side gondolas, 50 low side gondolas, 200 50-ton furniture cars, 250 stock cars, 25 75-ton mill gondolas, 65 feet in length and 25 50-ton flat cars.

General Chemical Co., 7 to 10 70-ton hopper cars, bids asked.

Pittsburgh Plate Glass Co. 1 tank car of 10,000 gallons capacity.

Lehigh Valley, repairs to 1460 coal cars, for which permission has been granted by Interstate Commerce commission to borrow $778,000.

Lower Boiler, Radiator Prices Are Announced

New York—A price revision in its entire line of boilers and radiators has been announced by the American Radiator Co., New York. Most of the changes were downward, but in some of the smaller items increases were made. Large boilers were reduced about 20 per cent and

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CANADA John Bertram & Sons Co. Ltd.
ENGLAND Burton, Griffiths & Co. Ltd.

one line of radiators about 10 per cent.

Arthur R. Herske, vice president, said the revisions were designed to encourage volume buying and indicate that demand for building products had already increased substantially. He expressed his belief that an upturn in the purchase of new homes was under way.

Semifinished

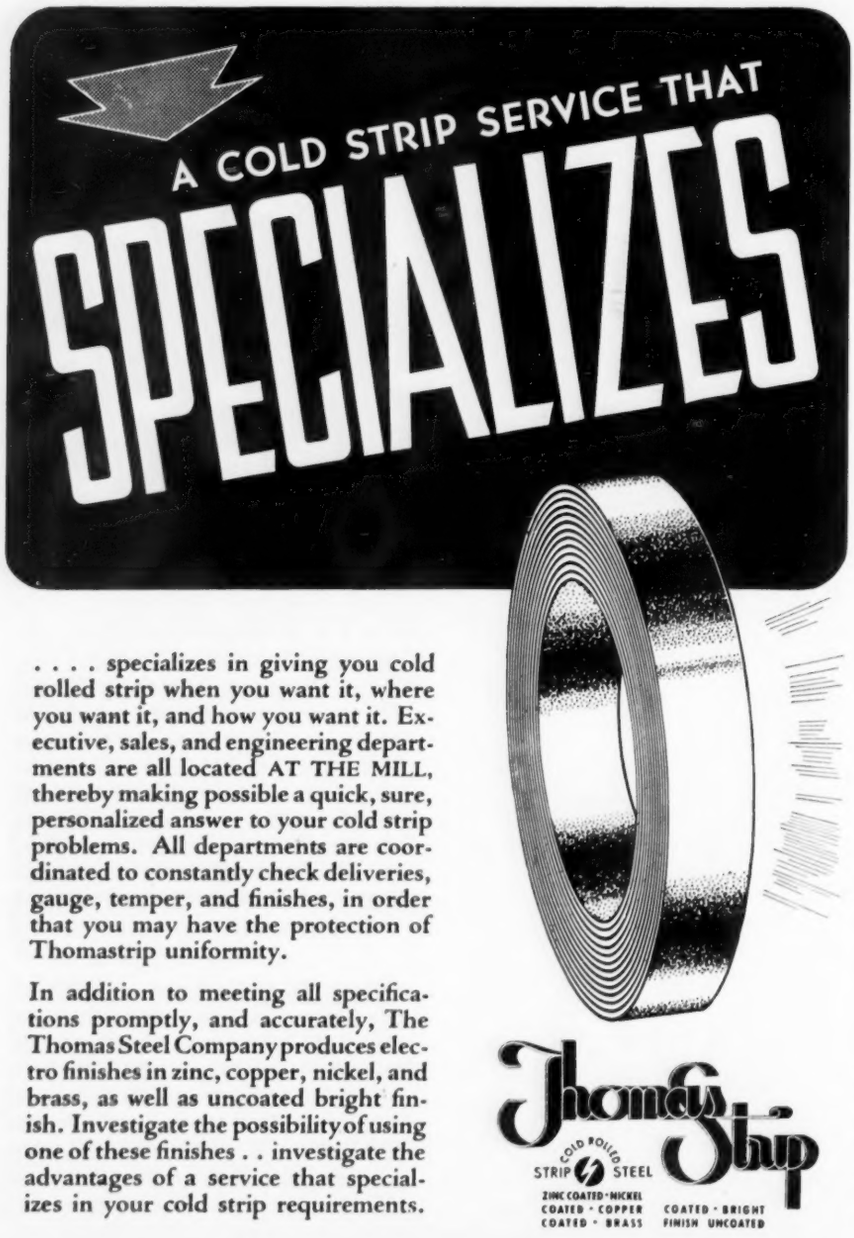
Semifinished Prices, Page 85

Demand for semifinished steel is at the low level of last week. The downward trend has been arrested by somewhat better orders for sheet bars, but this is only a temporary condition and does not seem to indicate any trend for the better. Orders are spotty and for the most part small.

Cold-Finished

Cold Finished Prices, Page 85

Pittsburgh — Quickening in orders for cold-finished steel noticeable during the early part of April has disappeared and orders, although continuing to trickle in slowly, are small and largely fill-in items for jobbers. However, most producers seem to believe the total for April will approximate that of March.



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Shapes

Structural Shape Prices, Page 84

Pittsburgh—Inquiries and orders were down substantially last week, although some good tonnages are now pending, including 2500 tons for a state industrial school at Whitehill, Pa. The Will Rogers memorial stadium at Colorado Springs, Colo., was awarded to American Bridge Co., Pittsburgh.

Cleveland—Little business has developed in the structural market recently. Inquiries and awards from private sources are limited to tonnages under 100 tons. Public projects dominate with considerable tonnage in probable expansion of the municipal power plant here and a number of grade crossings scheduled to appear soon. Bids go in April 29 on the Main street bridge, Cleveland, involving approximately 10,000 tons. Fabricated prices are unsteady.

Chicago — Bridges predominate new inquiries and include 2200 tons in three southern states. Awards are light and with few major projects pending in this district, little improvement is in immediate prospect.

New York—Inquiry is slightly heavier, lifted by two projects, Needle Trade school, New York, 2500 tons, and contract 8, Queens midtown tunnel, the latter closing May 10 with the New York tunnel authority. American Bridge Co., Pittsburgh, booked the largest contracts, 4500 tons, Queens land section, East river tunnel and close to 2100 tons, structural steel for a seaplane hangar, North Beach, New York, bidding 3.64c a pound on the lat-

Shape Awards Compared

	Tons
Week ended April 23	25,971
Week ended April 16	19,556
Week ended April 9	29,484
This week, 1937	17,178
Weekly average, year, 1937	16,060
Weekly average, 1938	16,326
Weekly average, March	16,309
Total to date, 1937	475,616
Total to date, 1938	277,540

Includes awards of 100 tons or more.

ter, delivered job site. Bridge requirements lag, New York closing this week on several structures taking 725 tons.

Philadelphia—Activity is spotty with few awards of more than 100 tons and with 550 tons for the Security prison in this state, on which John McShain, Inc., this city, general contractor, is low. Bids exceeded appropriations on this latter project and word is now being awaited from Washington as to whether further funds will be available. Bids will be open April 29 on nine state bridges, totaling 385 tons.

Boston—Richard White Inc., Boston, is low on the Wickford Junction railroad bridge, North Kingston, R. I., closing April 18 and taking 617 tons. Vermont bridge inquiries now total 305 tons, I-beam spans, two closing April 29. Maine also has a small bridge out, the first of the year. The Massachusetts General hospital job, the largest pending, may be welded.

Seattle—About 7000 tons are involved in a 5000-foot trestle for the Coulee dam project awarded to Bethlehem Steel Co., by Consolidated Builders Inc. Same interest will fabricate at its Alameda, Calif., plant 1200 tons required for three traveling cranes, overall length 355 feet, for Colby Steel & Engineering Co., Seattle, also for Coulee dam.

Shape Contracts Placed

7000 tons, high trestle for Coulee dam project, to Bethlehem Steel Co., Bethlehem, Pa.

4500 tons, Queens land section, East river tunnel, New York, to American Bridge Co., Pittsburgh; Charles F. Vachris, Inc., Brooklyn, bids March 30, to New York tunnel authority.

2100 tons, seaplane hangar, North Beach airport, New York, to American Bridge Co., Pittsburgh, at 3.64c a pound, delivered site; bids April 18, state procurement officer, treasury department, New York.

1852 tons, sheet piling, lot No. 2, proposal 422, United States engineer office, Los Angeles, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, three traveling cranes Coulee dam project, to Colby Steel & Engineering Co., Seattle; to be fabricated by Bethlehem Steel Co., Alameda, Calif.

1110 tons, Possum Kingdom dam, Mineral Springs, Tex.; 660 tons to Omaha Steel Works, Omaha, Nebr., 450 tons to Pittsburgh-Des Moines Steel Co., Pittsburgh.

910 tons, alterations, grand central postoffice, New York, to Taylor-Fichter Structural Steel Co., New York; through Millimet Construction Co., Union City, N. J.

700 tons, Will Rogers stadium, Broadmoor Hotel Inc., Colorado Springs, Colo., to American Bridge Co., Pittsburgh.

575 tons, towers and extensions, Niagara, Lockport & Ontario Power Co., Buffalo, to Lehigh Structural Steel Co., Allentown, Pa.

550 tons, addition, University of Wisconsin memorial union, to R. C. Mahon Co., Detroit; through Jacobson Bros. Co., Chicago, general contractor.

440 tons, state bridge, project 304-C, Winslow, Nebr., to Omaha Steel Works, Omaha, Nebr.

405 tons, sheet piling, lot No. 1, proposal 422, United States engineer office, Los Angeles, to Inland Steel Co., Chicago.

370 tons, Y. M. C. A. building, Hartford, Conn., to Topper & Griggs Co., Hartford; Bethlehem Fabricators Inc., New York, to fabricate. Industrial Construction Co., Hartford, general contractor.

300 tons, Rockne memorial building, University of Notre Dame, Notre Dame, Ind., to Indiana Bridge Co., Muncie, Ind.

260 tons, Dupont D building, World's fair, New York, to Ingalls Iron Works Co., Birmingham, Ala.; through Turner Construction Co., New York.

260 tons, bridge No. 36.6, girder spans, Pacific, Mo., for St. Louis-San Francisco railway, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, administration building, Buffalo municipal airport, Cheektowaga, N. Y., to Ernst Iron Works, Inc., Buffalo; George W. Walker, Inc., Buffalo, general contractor.

250 tons, administration building, Buffalo municipal airport, to Ernst Iron Works Inc., Buffalo.

235 tons, state highway bridge FAGS SS-38-5, Westchester county, New York, to American Bridge Co., Pittsburgh.

225 tons, glass industries building, World's fair, New York, to Belmont Iron Works, Philadelphia; through A. L. Hartridge Co., New York.

215 tons, central school, Red Hook, N.

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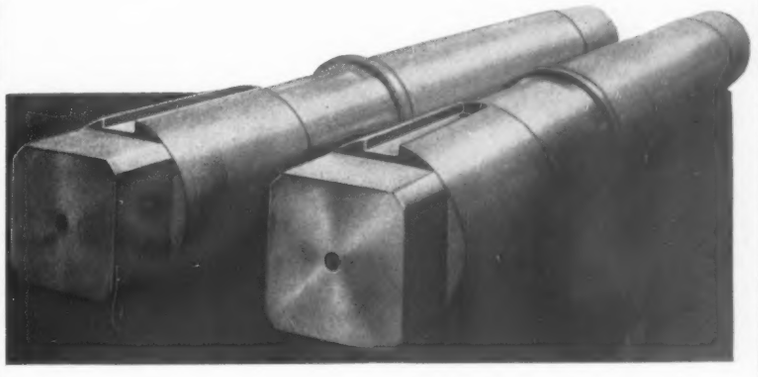

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Behind the Scenes with STEEL

Insect in Ointment

■ Every once in a while there turns up a thorn among the roses, a discordant note in the melody of our little enterprise. But since we like to brag of our bouquets, we also must mention occasionally a brickbat or two just for contrast. You see, last week business reply cards went out to a number of STEEL's readers, the catch line being "Your time is valuable!" Then followed a bit of propaganda about the joys that would attend renewing of their subscriptions. The reply card, to be mailed us, stated "You're right! Our time is valuable!" And went on with lovely words to the effect that we had their permission to renew the subscription for the coming year. Almost at once the cards started coming back fast and furiously —renewed subscriptions. But in the stack was discovered a *bete noir*. This card still bore the line "You're right!" Our time is valuable!" Everything else had been crossed out except the company name and a curt "Please discontinue sending it!" Oh, well, anything for a laugh.

Spring in Aurora

■ *"Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds"*

Herodotus

Zass so? What if even a snow plow can't get through? Take the case of Frank Gooding Associate Editor and ambassador of good will. Frank had an appointment with the head of an Aurora, Ill. fabricating plant on April 8—a nice spring day for a little drive out from Chicago. But March going out like a lion must have taken the road to Aurora, too, for just outside of Chicago it started snowing and blowing and yowling and howling. The road was passable to within ten miles of Aurora. Snow plows battled four miles farther, then bid the following caravans turn around and go back to the next town lest they freeze all night in the snow drifts. But the snow was so deep they couldn't even get back, and STEEL's emissary had to spend the night in a farmhouse. In the morning came another snow plow which made only 100 yards in two hours, with the worst still ahead. So Frank could do naught but return to Chicago, where it's always June (or January).

"Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds unless they get stuck in back of a snow plow."

Shrdlutus

31-Year Fast

■ If you think we felt sorry for Frank after the abovementioned disappointment, imagine how we felt upon glancing at another of his reports, this describing a visit to International Harvester Co. and beginning "I have known Hunger since about 1917"! A fine thing, we thought, a loyal employe complaining so bitterly of his lot. Could we not take up a collection and forward the wherewithal for doughnuts and coffee? Or did we have within our ranks one who had long since broken the fasting record of Reverend Noe? The answer of course, was noe. Frank was merely speaking of E. A. Hunger of International Harvester's publicity department.

Arches of Triumph

■ No matter how you look at it, that article about refractory arches on page 42 this week is constructive. STEEL's editors felt that rule-of-thumb methods for constructing such arches were no longer in vogue and that the definite and successful methods should be described for the benefit of the readers, hence Messrs. McDowell and Gill's enlightening article. Only the first part of this work is presented this week, the second half to appear shortly in these pages.

—SHRDLU

—*The Market Week*—

Y., to James Mcinney & Son, Albany, N. Y.

190 tons, almshouse, New Lisbon, N. J., for Burlington county, to Park Iron & Steel Co., New York.

165 tons, building, Billhuber-Knoll Co., Orange, N. J., to Belmont Iron Works, Philadelphia; through W. J. Barney Corp., New York.

160 tons, steel piling, Nome, Alaska, harbor improvement to Bethlehem Steel Co., Seattle, by U. S. engineer.

160 tons, coal breaker for Glenn Alden Coal Co., Ashley, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, beam bridges, project 304, Winslow, Nebr., to Omaha Steel Works, Omaha, Nebr.

145 tons, prison, contract A-8, La Grange, Ky., to International Steel Co., Evansville, Ind.

135 tons, new Hemenway gymnasium, Harvard University, Cambridge, Mass., to New England Structural Co., Everett, Mass.

130 tons, warehouse building, Mobile, Ala., to Southern Steel Works Co., Birmingham.

130 tons, bridge F6A, Stone county, Arkansas, to Vincennes Steel Corp., Vincennes, Ind.

125 tons, school, Scio, N. Y., to R. S. McMannus Steel Construction Co., Buffalo.

120 tons, addition, boiler house, Peru, Ill., to Davenport Machine & Foundry Co., Davenport, Ia.

115 tons, school, Highland, N. Y., to F. G. Schaefer Iron Works, Edgewater, N. J.; E. Ossie, Highland, N. Y., general contractor. Truscon Steel Co., Youngstown, O., awarded 50 tons, reinforcing bars.

115 tons, assembly building, state school, Wassaic, N. Y., to Belmont Iron Works, Philadelphia; through Amsterdam Building Corp., New York.

110 tons, school, Rodoy Grove, Pa., to Griffith Custer Steel Co., Johnstown, Pa.

105 tons, bridge FAGH 375A, Bayfield county, Wisconsin, to Lakeside Bridge Co., Milwaukee.

100 tons, launch repair dock for Panama canal commission, Panama, to Belmont Iron Works, Eddystone, Pa.

100 tons, bridge FAP 451-C, Grant county, Wisconsin, to Clinton Bridge Works, Clinton, Ia.

Unstated, steel sheet piling, proposal 2612, state procurement office, treasury department, Richmond, Va., to Corrugated Sheet Steel Piling Corp., Chicago, bids April 5.

Shape Contracts Pending

7000 tons, contract 8, Queens mid-town tunnel, New York.

2500 tons, Needle Trade school, New York; bids in, steel work direct, fabricating and erecting, board of education, New York.

2500 tons, state industrial school, White Hill, Pa.

1500 tons, superstructure, U. S. government building, world's fair, New York; George F. Driscoll Co., Brooklyn, low, bids April 19.

1400 tons, four bridges, for cloverleaf development, Brecksville, O., bids soon.

1500 tons, approach, George Washington bridge, New York; bids May 10 to port of New York authority.

1139 tons, Puget Island bridge, Washington state project; Parker-Schram Co., Portland, general contractor.

617 tons, Wickford Junction railroad bridge, North Kingston, R. I.; Richard White Inc., Boston, low, bids April 18.

600 tons, bearing piles, two river piers, Main street bridge, Cleveland; Lombardo Bros., Cleveland, low; also in-

cludes 186 tons of reinforcing bars.
600 tons, hospital, Newtown, Conn.; taking estimates.
560 tons, state bridge Hylebos creek, Tacoma, Wash.; General Construction Co., Seattle, general contractor.
550 tons, Security prison, Pennsylvania, pending word from Washington as to availability of additional funds; project also requires 2000 tons of reinforcing bars, and 500 tons of jail steel; John McShain, Philadelphia, low on general contract.
500 tons, Lenox vocational school, Washington; John W. Hunt Co., Washington, low, bids April 15.
500 tons, bridge, Sylvania, Ga.
500 tons, bridge, Port Royal, S. C.
500 tons, seven bridge projects, Missouri highway commission, Jefferson City, Mo.
400 tons, hospital, White Plains, N. Y.; taking bids.
400 tons, hangar, Allbrook field, canal Zone.
325 tons, nine Pennsylvania state bridges, 18 to 68 tons each; bids April 29.
320 tons, state bridge 312, Shiocton, Wis.
300 tons, three highway bridges in Oklahoma, Oklahoma highway commission, Oklahoma City, Okla., bids in.
237 tons, three-span I-beam bridge, route 7, Bennington, Vt.; bids May 6.
230 tons, state highway bridge, Muhlenberg, Ky.
215 tons, central school, Greigsville, N. Y., Border Building Co., Buffalo, low.
200 tons, central school, Cuba, N. Y., bids May 5.
200 tons, repairs to state bridge, Hinton, W. Va.
200 tons, bridge, Greenville, Ky.
130 tons, Y. M. C. A. building, Carneys Point, Pa., bids opened.
150 tons, Washington school, Trenton, N. J.; to be rebid.
120 tons, irrigation canal bridges, Roza project; bids to reclamation bureau, Yakima, Wash., May 9.
110 tons, two I-beam state bridges, Irasburg and Vershire, Vt.; bids April 29, H. E. Sargent, commissioner of highways, Montpelier.

Reinforcing

Reinforcing Bar Prices, Page 85

Chicago—Concrete bar inquiries are more numerous, pending jobs showing a moderate increase despite the absence of many large jobs. Smaller work is fairly heavy in the aggregate. Awards include 250 tons for the Torrence avenue bridge.

Concrete Bars Compared

	Tons
Week ended April 23	10,401
Week ended April 16	12,772
Week ended April 9	2,872
This week, 1937	4,430
Weekly average, year, 1937	6,266
Weekly average, 1938	5,620
Weekly average, March	3,893
Total to date, 1937	71,142
Total to date, 1938	95,543

Includes awards of 100 tons or more.

Cleveland—Requirements for reinforcing bars are limited to small miscellaneous tonnages under 100 tons. No improvement in inquiries has been noted recently, although comparatively substantial tonnages are involved in grade crossings and other similar state projects.

New York—Few large-tonnage contracts remain to be closed following a recent flurry in buying, including better than 1000 tons for the Queens mid-town tunnel and a Queens, N. Y., sewer. Several hundred tons of highway mesh have also been bought. While 2.86c, delivered job site has been shaded, billet steel bars are holding firmer on small lots.

Pittsburgh—The outlook in reinforcing bars is fair, with a fair amount of inquiries entering the market. Several large tonnages have recently been awarded, and there are some large projects for which inquiries have not yet been received.

Philadelphia—Outstanding in the

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current market is the award of 1500 tons for a culvert at Kingston, Pa., to Taylor-Davis Inc., this city. Two thousand tons for the Security prison, to be built in this state, are pending word from Washington as to provision of additional funds, bids having exceeded the original appropriation. Small miscellaneous tonnage is pending for state bridge work, bids to be opened at Harrisburg, Pa., April 29.

Boston—Including small lots, reinforcing steel contracts approximate 700 tons, 435 tons being for a hospital building, Boston. New Haven Road Construction Co., New Haven, Conn., is low on two highway projects, that state, taking 480 tons, mostly mesh. Prices have softened on some recent tonnage.

Seattle—Rolling mill operations are slightly higher, due to an increase in miscellaneous tonnages, but volume is far under levels of a year ago. Of 700 tons reinforcing required for the Heart mountain and Shoshone canals, Wyoming, reclamation bureau is reported to have placed 170 tons with Sheffield Steel Corp., Kansas City, Mo., the balance pending. Washington state highway projects, involving 350 tons, were awarded this week. About 450 tons are involved in Washington state highway contracts, bids at Olympia, May. 3.

San Francisco—Demand remains exceptionally quiet with the majority of pending business being confined to lots less than 80 tons. Laclede Steel Co. took the largest award, 104 tons for the bureau of reclamation for delivery at Blaisdell, Ariz. No award has yet been made on 4233 tons for the United States engineer office, Los Angeles. Awards this year aggregate 27,154 tons, compared with 26,938 tons in 1937.

Reinforcing Steel Awards

1500 tons, U. S. engineer, Baltimore, to Taylor-Davis, Inc., Philadelphia, at $74,842.55, f.o.b., Kingston, Pa.; bids April 5.

1500 tons, culvert in connection with a flood control development, Kingston, Pa., awarded through the United States engineer, Baltimore, to Taylor-Davis Inc., Philadelphia.

1150 tons, sewage disposal plant, Baltimore, to Concrete Steel Co., New York; Virginia Engineering Co., Newport News, Va., general contractor.

570 tons, sewer, Queens, N. Y., to Carroll-McCreary Co., Inc., Brooklyn; Charles Bennett Improvement Co., Brooklyn, general contractor.

550 tons, Clarksville, Mo., dam, to Inland Steel Co., Chicago.

500 tons, Queens land section, East river tunnel, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Charles F. Vachris, Inc., Brooklyn, general contractor.

500 tons, prison, La Grange, Ky., to Truscon Steel Co., Youngstown, O.

435 tons, surgical building, Massachusetts General hospital, Boston, to Concrete Steel Co., New York.

280 tons, Memorial auditorium Burlington, Iowa, to Sheffield Steel Corp., Kansas City, Mo.

270 tons, underpass, Missoula, Mont., to Bethlehem Steel Co., Bethlehem, Pa.

260 tons, underpass, Helena, Mont., to Bethlehem Steel Co., Bethlehem, Pa.

260 tons, mesh highway, Ballston, Saratoga county, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; through A. I. Savin Construction Co., Hartford, Conn.

250 tons, Torrence avenue bridge, Chicago, to Ceco Steel Products Corp., Chicago.

240 tons, highway mesh, Dutchess and Putnam counties, New York, to American Steel & Wire Co., New York; through Lane Construction Corp., Meriden, Conn.

235 tons, bridge, Lawrence county, Butte, N. Dak., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, approximate, bureau of reclamation, Denver, to Laclede Steel Co., St. Louis, schedule 1, pro. A-46,560-A, $9395.50, f.o.b. Rutledge, Tex.; bids March 31.

187 tons, invitation 48,115-A, bureau of reclamation, Corbett, Wyo., to Sheffield Steel Corp., Kansas City, Mo.

171 tons, invitation 46,558-A, bureau of reclamation, Rutledge, Tex., to Southern States Steel Co., St. Louis.

170 tons, reclamation projects in Wyoming, to Sheffield Steel Corp., Kansas City, Mo.

150 tons, state procurement officer, New York, to W. Ames & Co., Jersey City, N. J.; bids April 15.

135 tons, mostly mesh, East approach, Connecticut river bridge, Portland, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; through A. I. Savin Construction Co., Hartford, Conn.

127 tons, bridges, Fairfield and Westport, Conn., to Truscon Steel Co., Youngstown; through Mariani Construction Co., New Haven.

122 tons, invitation 22,257-A, bureau of reclamation, Mills, Wyo., to Colorado Fuel & Iron Co., Denver.

120 tons, filtration plant, Huntingdon, Pa., to Claster Supply Co., Lock Haven, Pa.

110 tons, central school district No. 3, Romulus, N. Y., to Truscon Steel Co., Youngstown, O.

105 tons, school, Belmont, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

104 tons, bureau of reclamation, invitation 24,616-A, Blaisdell, Ariz., to Laclede Steel Co.

100 tons, Y. M. C. A. addition, Hartford, Conn., to Scherer Steel Co., Hartford.

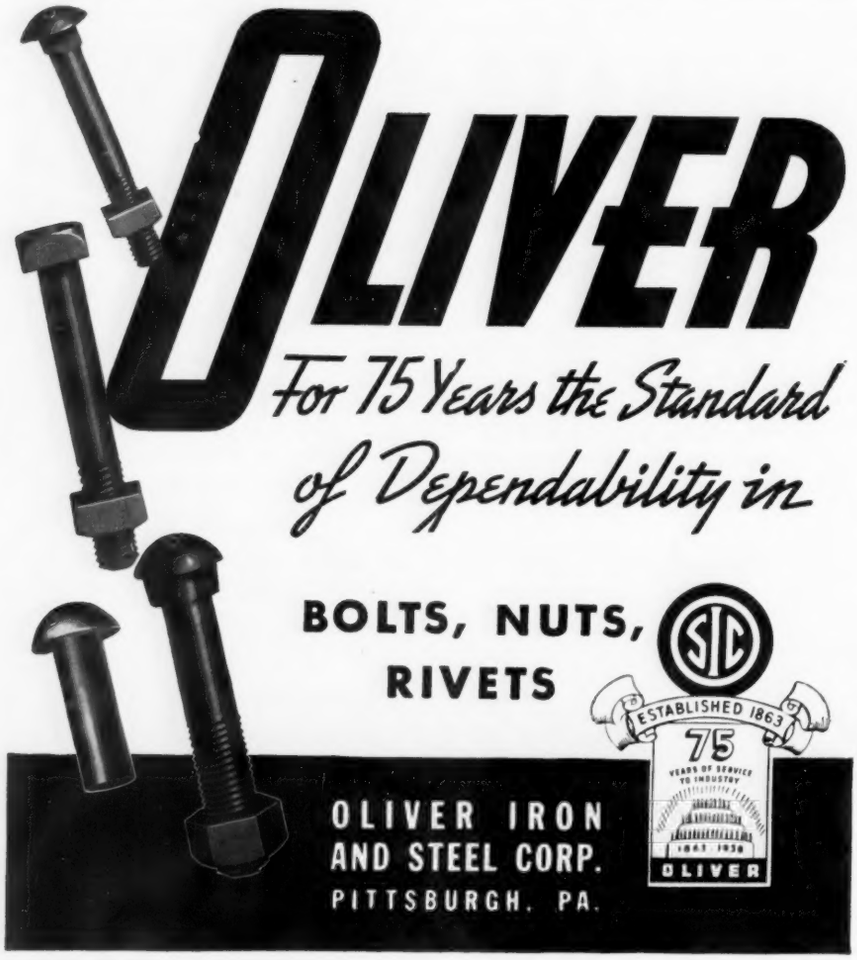
100 tons, bridge, St. Paul, Ramsey county, Minnesota, to Paper Calmenson Co., St. Paul; Dunnigan Construction Co., St. Paul, general contractor.

Reinforcing Steel Pending

2000 tons, Security prison, Pennsylvania, pending word from Washington as to whether added funds will be supplied to meet bids which exceeded the original appropriation; project will also require 550 tons of shapes and 500 tons of jail steel; John McShain Inc., Philadelphia, is low on general contract, as noted in a previous issue.

1400 tons, dam, Kingston, Pa., army engineers; Taylor-Davis Inc., Philadelphia, low.

890 tons, mesh, highway projects, Herkimer Ulster, Delaware, and Erie



counties, New York; bids April 26 at Albany.
400 tons, mesh, optional highway 38-4, Nassau county, New York; Good Roads Construction Co., Wantagh, N. Y., low.
325 tons, contract 8, Queens mid-town tunnel, New York; bids may 10, New York Tunnel Authority.
280 tons, waterworks, Leavenworth, Kans.
270 tons, mostly mesh, highway project, Merritt parkway, Norwalk, Conn.; New Haven Road Construction Co., New Haven, low, at $151,153.90, bids April 18.
220 tons, state Hylebos bridge, Tacoma, Wash.; General Construction Co., Seattle, general contractor.
210 tons, mostly mesh, highway project, Hamden, Conn.; New Haven Road Construction Co., New Haven, low at $258,869.19, bids April 18.
201 tons, four bridges, Santa Barbara county, California, for state; bids opened.
200 tons, Fairfield hospital, Newton, Conn.; bids April 27.
140 tons, Washington state bridge and overcrossing; D. Nygren, Seattle, and Charles A. Powers, Spokane, general contractors.
137 tons, unit of Roza canal project, Washington state; bids to reclamation bureau, Yakima, Wash., May 9.
100 tons, school structure, Anchorage, Alaska; MacDonald Construction Co., Seattle, general contractor.
100 tons, police station, Milwaukee.
100 tons, bridge, Santa Clara county, California, for state; bids opened.
100 tons, sewage treatment plant, Greenwich, Conn.

Pig Iron

Pig Iron Prices, Page 86

Cleveland—Pig iron producers report shipments so far this month are about on a par with March. Foundry operations are substantially unchanged as reflected in coke shipments. There is no contract buying, current orders being for spot delivery and represent only actual requirements. Prices are firm.

Pittsburgh — There has been little or no change in the pig iron market. Prices are firm and orders slow, with less than carload orders numerous and few carload orders. Foundry activity shows no increase and there is little likelihood any great demand will develop soon.

Chicago — Pig iron shipments are off slightly from the rate a month ago and with foundry operations tending downward, there is little prospect of an upturn in pig iron sales or deliveries soon. While some foundries still are working off stocks, many plants have reduced inventories sufficiently to necessitate new buying. Orders are small, with the $24 price for No. 2 foundry and malleable iron steady.

Boston — With foundry operations averaging 25 per cent, pig iron demand is meager. There is no advance buying. Large melters still draw on ample stocks. Dullness is especially noted at foundries producing for the textile mill equipment industry and most jobbing shops.

Cincinnati — Slowing of demand for machine tool castings has lightened the district melt. This situation combined with shipments last month to escape higher freight rates will put April pig iron tonnage below March. Stove foundries are fairly active, some on a five-day schedule. New listings of delivered prices are being prepared as sequel to intrastate freight changes, effective last week.

St. Louis—The pig iron melt holds about steady, reduction in ingot operations having been counterbalanced by a moderate increase at jobbing plants and some specialty shops.

Buffalo—Pig iron shipments have tapered off to around the level of March. Volume is hit hardest by the lack of forward contracting and the complete absence of appreciable buying by automobile manufacturers. Buying from miscellaneous sources shows some pickup, but improvement is not sustained. Foundries are working on a hand-to-mouth basis.

Philadelphia — While some foundries have been able to step up operations, little improvement appears in the general average melt and as a result pig iron continues to move in limited quantity, principally carlots for immediate needs.

New York — Early awards are expected of 1000 of 1X foundry for the Thatcher Furnace Co., Garwood, N. J., for delivery over the remainder of this quarter. Northern and southern furnaces are likely to participate. The A. P. Smith Mfg. Co., Orange, N. J., is inquiring for 100 tons of 1X iron. Buying generally continues on hand-to-mouth basis and apart from the Thatcher inquiry, lists are small. This also applies to export demand, which is as light as at any time so far this year.

Birmingham, Ala.—While there has been no reduction in the number of furnaces in blast pig iron interests are far from optimistic over immediate prospects. Consumption has not shown the expected gain and some iron is being stacked. Melters are still crying for shipping instructions against business already booked.

Toronto, Ont.—While there has been a minor slowing down in demand for merchant iron the daily

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melt is holding at its former level with some indications of improvement. Pig iron sales for the week dropped to around 1800 tons, while deliveries against contract accounted for additional shipments bringing the total to around 2500 tons. Current demand is for spot delivery with orders appearing at frequent intervals in lots of 50 to 400 tons.

Scrap

Scrap Prices, Page 88

Pittsburgh — Weakness continues in the scrap market, with no interest shown by mills and little dealer activity. Some small quantities of No. 1 heavy melting steel have been offered to mills at 50 cents under prevailing quotations and brokers are able to obtain some quantities at $11.50, although no large tonnage has appeared in the markets.

Chicago — Scrap market activity is at the lowest ebb in many years. Consumers are buying infrequently and in small lots, and trading between dealers and brokers is at a minimum. Scrap is coming out slowly and sellers encounter difficulty in picking up some grades, particularly steel specialties. Heavy melting steel nominally is unchanged at $11 to $11.50.

Cleveland—Present low rate of activity in iron and steel scrap is measured by small-lot shipments, largely confined to borings and turnings, and occasional small shipments of pressed sheets. Some Youngstown district mills that had been taking some material have issued further restrictions.

St. Louis—Recent mill purchasing of heavy melting steel, aggregating about 10,000 tons, has had the effect of firming the market on that grade, and dealers are experiencing some difficulty in getting tonnages to apply on contracts. Otherwise the market is decidedly weak, with additional specific reductions on a number of items, which have brought prices into new low territory.

Cincinnati — Mill demand for iron and steel scrap, except moderate tonnages of sheet clippings, is absent in this district. Prices are nominal, with tendency to sag on occasional distress offerings. Dealers are inactive and some finding holdings burdensome. Few items from April railroad lists were absorbed here.

New York — Dullness continues in iron and steel scrap, domestic buying limited to a few small lots by district foundries. No. 1 machinery and No. 2 cast for delivery to local consumers have been marked down 50 cents again to $12 and $10.50, respectively. Rails for rolling and heavy breakable cast are also down 50 cents, other grades being nominal with a weak tendency.

Boston—A few cars of steelmaking scrap have been released for shipment to Worcester, following resumption of ingot production by one open hearth, but the aggregate movement of such grades is small and new buying absent. District foundries are also purchasing sparingly in small lots and there is no demand for material for shipment to Pennsylvania and other outside points. Little is being bought for export against old orders, shippers having covered on current boat requirements. Prices continue easy for both domestic and export consumption, brokers offering as low as $11.50 to $12, dock, for No. 1 and $10.50 for No. 2.

Detroit — Scattered weakness in scrap prices has moved a number of grades down 25 to 50 cents. A list of Chevrolet bundles went at $8, but this is believed to be a minimum figure. Borings are off 25 cents, as are busheling and turnings. Loose clips are marked down 50 cents to $4.75-$5.25.

Buffalo—Although bearish sentiment continues to dominate the iron and steel scrap market, dealers are encouraged somewhat by maintenance of a bid in the market by the principal consumer. The mill is paying $12 a ton for No. 1 heavy melting steel, with the usual differentials on other grades. Approximately 10,000 tons have been purchased by the mill. With No. 1 steel selling around the same level in the Pittsburgh market, dealers are willing to sell at that level here, as the local market is generally figured $1 a ton below Pennsylvania and Valley prices.

Philadelphia — Prices on several grades of scrap have again been reduced, including notably No. 1 steel, which is now holding nominally at $12.50 to $13, a decline of 75 cents. No. 2 steel is unchanged, however, and as a result the differential between the two is nearer normal than it has been in considerable time.

Seattle — Recent heavy export shipments, mostly in cargo lots, have generally cleaned up old commitments. Tidewater stocks as a result are well reduced and shipments from the interior are not heavy as current prices are not attractive to shippers. No new business of importance has come from Japanese buyers and in view of this situation and continued absence of rolling mills from the market, sales are at low ebb. In the absence of representative transactions, No. 1 heavy melting is nominally $12, varying according to grade and conditions affecting each deal. Foundry sales are small, in line with reduced operations.

Toronto, Ont.—Trading in iron and steel scrap is attracting little interest. Demand is steady but dealers are not in a position to deliver in quantity such lines as heavy melting steel, machinery cast and stove plate. Steel mills are taking delivery of heavy melting when offered by dealers and foundries are in the market for cast scrap. While offerings from rural districts have increased, supplies are by no means up to the average of 1937.

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Warehouse

Warehouse Prices, Page 87

Cleveland — Shipments out of warehouse have not continued the former rate of increase. In some instances tonnage has fallen behind comparable period in March. Warehouse distributors have decided not to put into effect revised quantity differentials on hot-rolled steel products such as initiated in Philadelphia a few weeks ago. They reason that it was a local condition due to export competition and therefore not applicable here. Inventory situation of most distributors is adequately balanced.

Chicago—Sales are about on a par with March rate. This is in contrast to usual downward tendency in April. Volume, however, is well below that of a year ago and has moved moderately lower than in 1936.

New York—Demand for steel out of warehouse has leveled out with current incoming volume hardly up to last month. Buying by small industrial shops is notably slack and spotty gains in steels influenced by seasonal trends have not broadened. Some jobbers are moving sheets at shaded prices.

Boston—Aggregate volume is disappointing, the recent mild improvement being barely maintained. Orders are small, but slightly more numerous. Volume diverted to jobbers as a result of meager buying direct from mills has been smaller than expected. Demand for specialty items in small lots is fairly substantial in view of light operations by most metalworking industries.

St. Louis—Warehousemen report buying on a hand-to-mouth basis, but volume holding fairly steady and indications pointing to April sales about equal to the March total. Demand for building items is somewhat better, due to erection of numerous small dwellings. Large fabricating interests however, are taking little at the moment.

Cincinnati — Warehouse sales are little changed in volume from recent weeks. Inquiries for building materials are infrequent and light. Minor changes in delivered prices of some items have followed freight rate increases.

Baltimore — Last week jobbers revised quantity extras on hot-rolled products, in line with the schedules put into effect in the Philadelphia district earlier. Only apparent difference was in the base quantity bracket, which here ranges 400 to 1999 pounds, as against 500 to 1999 pounds at Philadelphia. The commodities affected are bars, shapes, plates, strip and No. 8 to 16 gage hot-rolled annealed sheets. Most base quotations reflect the increase in less carlot rates from Pittsburgh.

Philadelphia — Warehouse business is being fairly sustained. Various demands are coming from building trades and manufacturing consumers are turning to jobbers for small lots. Volume, however, is well below normal for this season.

Buffalo—Warehouse distributors report a slight dip in demand. Buying is barely holding around the level of the previous week. Some soft spots in the price structure are evident, especially in sheets, but no changes have been made as yet.

Steel in Europe

Foreign Steel Prices, Page 87

London — (*By Cable*) — Foreign trade of Great Britain in March was well above February, imports showing a heavy gain, attributable in part to increased shipments before reimposition of heavier import duties. Imports in March were 276,785 tons, compared with 230,400 tons in February, 46,385 tons larger. Exports were 176,051 tons, an increase of 19,321 tons over the 156,730 tons exported in February.

Markets were quiet through the Easter season. Most consumers of pig iron and semifinished steel are well supplied but revival in new business is foreseen shortly. Construction and shipbuilding works are busy but galvanized sheets and tin plate are dull.

The Continent reports slightly greater activity and price concessions are practically ended. Japan is buying steel plates and Russia is reported to have placed orders for 4500 tons of sheets.

Tin Plate

Tin Plate Prices, Page 84

New York—Demand for tin plate for general line cans continues to improve, and with a pick-up anticipated shortly in releases for food packing containers, the current month is expected to be the best so far this year. A still further gain is anticipated in May. Stocks carried over from last year are now being worked off, a factor in the present improvement in new business. Labor difficulties still hamper certain small canmaking plants here, but generally speaking they have not proved as disrupting as feared a few weeks ago. To date strikes have been confined to four plants. Export demand continues sluggish, reflecting the large carry-over abroad at the beginning of this year.

Ferroalloys

Ferroalloy Prices, Page 86

New York — Ferromanganese shipments tapered over the past week. This reflects restricted steelmaking operations, and indications point to little early improvement. Ferromanganese is steady at $102.50, duty paid, Atlantic and Gulf ports.

Domestic spiegeleisen, 19 to 21 per cent, is $33, Palmerton, Pa., and 26

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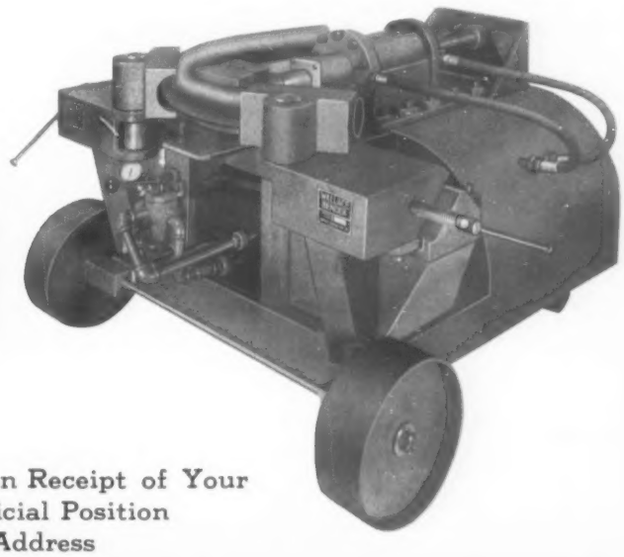

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to 28 per cent at $39. Shipments are light, also in line with limited steel output. Ferrotungsten is easier at $1.85 to $1.95 per pound tungsten contained in carlots, reflecting the recent further decline in tungsten ore.

Nonferrous Metals

New York—Bullishness in domestic nonferrous metal markets was not supported abroad last Tuesday when the London Metal Exchange reopened following the Easter holidays. Markets here went through a period of readjustment during the balance of the week.

Copper—Prices in the export market eased steadily from a high of 10.10c on Monday to a close of 9.85c, c.i.f. In the absence of both stimulating and depressing news buying tapered as the week progressed. Business in the domestic market was active during the first half of the week with sales on Wednesday alone totaling 2481 tons but interest failed to hold up. Electrolytic closed unchanged at 10.10c, Connecticut.

Lead—An increase of 5377 tons in refined lead stocks during March to a total of 143,511 tons, due to a drop in the daily average shipment rate to 1002 tons while production was curtailed to 1175 tons, had no appreciable affect on the price tone. All first hand sellers quoted on the basis of 4.50c, New York, and 4.35c, East St. Louis. Sales held at a moderate rate.

Zinc—Prime western advanced steadily from a range of 4.00c to 4.25c at the close of the previous week to a flat price of 4.25c, East St. Louis, on Tuesday. Total sales for the week, however, were light.

Tin—Straits spot tin prices declined steadily from a high of around 40.00c on Monday to about 38.65c at the weekend. When the London market failed to rise to the levels attained here during the Easter holidays, a reaction was inevitable. Industrial sentiment as reflected in Wall street continued to be a strong factor.

Antimony—Interest continued dull with all prices unchanged at 13.75c for American spot and 15.75c, duty paid New York, for Chinese spot.

Navy Awards Contracts

New York—Buffalo Forge Co., Buffalo, is low on forced draft blowers and spares, eastern navy yards and Puget Sound, Wash., at $15,939.32, schedule 3039, navy department.

Pittsburgh Screw & Bolt Corp., Pittsburgh, is low on steel bolts and nuts for the Brooklyn yard at $10,396.08, schedule 3265.

Storms Drop Forging Co., Springfield, Mass., has been awarded the contract for nickel-copper alloy forgings for the Newport, R. I., torpedo station shops at $7994.80, bids March 15, schedule 2902.

Open Hearth Operators Seek Better Practice

(*Concluded from Page* 20)

and portland cement and is giving good results. The runners are lined with old tap hole material and a fire clay slurry.

Deoxidizing practice cited by one steelmaker involves adding 80 per cent of the aluminum in the ladle. At another plant the practice is to add 75 per cent of aluminum in the ladle and 25 per cent in the molds. At an Ohio plant the preference is to use from 75 to 80 per cent in the ladle. About 250 pounds of titanium is used on front fender grade of steel. Practice followed by another operator is to use from 0.1 to 0.15-pound aluminum in the molds per ton of steel.

The percentage of ferromanganese preferred by one steelmaker ranged from 20 to 30 for hot strip and from 28 to 37 for cold strip. Another shop reported the use of 25 to 35 per cent for hot strip and 35 to 45 per cent for cold strip.

Snaix in low-carbon steel were reported by a Pennsylvania metallurgist as being three times greater by count on the top surface of ingots than on the bottom surface. As a means of avoiding snaix, one operator packs asbestos between the bottom of the mold and the mold stool using a chisel tool.

Limestone high in magnesia gives better results than the low-magnesia grade in the opinion of one melter. He asserted that the high magnesia stone comes up soft and not lumpy.

Equipment

Chicago—Machinery and plant equipment sales remain slow, business lately holding around rate of preceding several weeks. Inquiries are fairly steady but closing on pending business frequently is postponed. Backlogs of machine tool manufacturers are declining though operations of some interests still are active.

Boston—From inquiries previously figured, a few machinery orders, generally for one or two units, are being taken, but new domestic business is slow. Operations in numerous shops are sustained by export backlogs. Foreign demand has slowed. Several district machine builders have booked a few units from the Detroit area. Some business has also been booked from refrigerator shops.

New York—New and improved models of metalworking machines are being brought out steadily. The long-range outlook for automatic and semiautomatic machinery is bright with shorter hours and other shop problems mounting. Inquiries for quotations on machinery and shop equipment are less active and buyers are slow to close on tools already figured. Government shops, including arsenals, are taking more

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machines and a sharp increase is expected if proposed appropriations are allowed.

Increased activity at shipyards is also expected to aid the machine tool trade. Percentage of obsolete machinery in shipyards is greater than the average for industry, which is still large. Export buying has slumped, due to less activity by Russia, although some heavy volume is still in prospect.

Construction and Enterprise

Michigan

BRIGHTON, MICH.—Voters approved bonds to finance $75,000 sewage treatment plant and $40,000 water supply distribution system. Ayres, Lewis, Norris & May, Ann Arbor, engineers. (Noted in STEEL, March 14, 1938).

CARROLLTON, MICH. — Carrollton township is preparing plans for complete water system including distribution system, pumping equipment, hydrants and specials. Cost $150,000. WPA application will be filed. Francis Engineering Co., Eddy building, Saginaw, Mich., engineer.

EATON RAPIDS, MICH.—REA has allotted $75,000 to the Tri-County Electric Co-operative for constructing generating plant project; also $50,000 to Fruit Belt Electric Co-operative, Cassopolis, Mich., for constructing 50 miles of line.

IRONWOOD, MICH.—City is preparing plans for sewage disposal plant. Cost $180,000. WPA aid will be asked. L. Adriansen, clerk.

NORTH MUSKEGON, MICH. — City council ordered A. E. Hansen, city engineer, to ask state health department at Lansing for permit to build and operate sewage disposal plant near Memorial causeway. Will ask for WPA aid. Cost $45,000.

ST. CHARLES, MICH.—City has sold bonds for waterworks system including wells, distribution system, mains, hydrants and accessories. Cost $410,000. Plans to be completed. Francis Engineering Co., Eddy building, Saginaw, Mich., engineer.

Connecticut

MANCHESTER, CONN.—Town acquired land near Hockanum river and plans constructing filtration plant on same. Cost to exceed $15,000. WPA project. Engineer not appointed.

NEWTOWN, CONN.—State, R. A. Hurley, commissioner of public works, is making plans for constructing electrical conduits, tunnels, steam lines, water pipes at Fairfield County State hospital. Cost $275,000.

New York

ALBANY, N. Y.—City is making surveys for removing water towers at Albany county jail and Ann Lee home and reconstructing same at Loudonville reservoir. Includes electric pumping equipment. Cost over $15,000. Requardt & Smith, care of owner, engineers.

NEW YORK—Bradley Machine & Tool Corp. was incorporated here with $20,000 capital to deal in machine tools. George E. Daniels, 36 West Forty-fourth street, New York, incorporator.

SOUTH FALLSBURG, N. Y.—Water board plans water supply system, including wells, pumps, reservoirs and mains. Cost $75,000. Maturity late 1938. A. Potter, 50 Church street, New York, engineer.

WARSAW, N. Y.—Village plans constructing and equipping chlorinating plant as substitute for proposed filtration plant project defeated by taxpayers. S. E. Preble, care of Industrial Planning Corp., 271 Delaware avenue, Buffalo, engineer. (Noted in STEEL, March 21, 1938).

Pennsylvania

BANGOR, PA.—North Bangor Slate Co. plans slate plant. Cost over $45,000. Engineer not yet appointed.

JOHNSONBURG, PA.—Borough, H. A. Miller, secretary, is making preliminary surveys for constructing alterations and additions to sewage disposal plant. Cost $25,000. Perrington & Remington, 509 Cooper street, Camden, N. J., engineers. (Noted in STEEL, April 4, 1938).

MILTON, PA.—Chef Boiardi Food Products Co., 5200 Harvard avenue, Cleveland, O., plans purchasing and installing transmission conveying equipment, machinery and equipment for processing tomatoes to be used in making spaghetti at Cleveland plant. Cost more than $10,000.

WELLSBORO, PA.—Wellsboro Electric Co., G. H. Hill, general manager, is taking bids for expanding light and power plant and distribution system plus additional equipment for generating plant. Cost $150,000. Private plans. (Noted in STEEL, April 11, 1938).

Ohio

CLEVES, O.—Village, R. R. Robinson, clerk, will hold special election April 26 for $50,000 bonds as village portion of $240,000 sewage disposal plant and sewerage system cost. WPA will furnish balance of funds. (Noted in STEEL, March 21, 1938).

WRIGHT FIELD, DAYTON, O.—War department, air corps, takes bids to 10 a.m., April 29, for two electric generating plants, manual starting with 5-kilowatt rating, delivery Works Progress administration, 3560 West Lake street, Chicago.

WRIGHT FIELD, DAYTON, O.—War department, air corps, takes bids to 10 a.m., April 28, for 162 electric portable drills, 110 volts, universal current, delivery Middletown, Pa., Osborn, O., and San Diego, Calif.; for 1825 long nose chain pliers, 475 needle-nose curved pliers, and 2400 diagonal-cutting 6-inch pliers, delivery Osborn, O., Duncan Field, Tex., Middletown, Pa., and San Diego, Calif.; until 10 a.m., May 3, for 282,000 feet of aircraft, power and lighting cable, delivery Middletown, Pa., Duncan Field, Tex., Osborn, O. and San Diego, Calif.

Illinois

CHICAGO—Hunter Foundry Co., 3547 South Morgan street, was incorporated here as a manufacturing concern. G. Brovet, H. L. Hatch, E. A. Austin, incorporators. P. G. Maurer & Co., 10323 South Michigan avenue, correspondent.

CHICAGO — Garber Ornamental Iron Works Inc. has been incorporated with 100 shares no par value stock to operate at 1121-23 South Kedzie avenue. Max Gerber, S. Lettvin, J. Charles, incorporators.

CHICAGO—Shaw, Naess & Murphy, 80 East Jackson boulevard, architects, are taking bids for three-story bottling plant at Seventy-third and State streets for Coca-Cola Bottling Co. of Chicago Inc., 1101 West Congress street.

NEW ATHENS, ILL.—City holds election soon to vote $35,000 in bonds for constructing sewage disposal plant complete with auxiliary equipment, piping, appurtenances and sanitary sewer system. Cost of project $106,000. PWA grant totals $71,000.

Indiana

INDIANAPOLIS—Indianapolis Tool & Die Corp., 600 Indiana Trust building, Indianapolis, has been incorporated to manufacture tools, dies and machinery, with 100 shares no par value stock.

Harry A. Weaver Jr., John G. McNutt, Cora Green, incorporators.

KENDALLVILLE, IND.—Board of public works receives bids May 6 at office of city treasurer, for constructing sewage treatment works. Project entirely financed by city. C. H. Hurd, 1039 Architects & Builders building, Indianapolis, consulting engineer.

TIPTON, IND.—Premier Hybrid Corn Co., Flora, Ind., plans modern plant and office building four miles from here. Cost with equipment $40,000 or more.

Alabama

CENTER, ALA.—Town will install filter plant, elevated tank and distribution system. Cost $45,000. J. W. Goodwin Engineering Co., Martin building, Birmingham, Ala., engineer.

DECATUR, ALA.—City, R. N. Harris, mayor, receives bids May 10 for furnishing labor, material supplies equipment and machinery necessary for complete municipal electric distribution system. Estimated cost $300,000. Specifications may be secured from T. M. Francis, Brown-Marx building, Birmingham, and Paul S. Haley, Jasper, Ala., engineers. Kenneth Markwell, chief project engineer, PWA, 938 Volunteer building, Chattanooga, Tenn.

MOBILE, ALA.—Hollingsworth-Whitney Co., Boston, Mass., will occupy a site on the Alabama State docks property where it will erect a paper mill. Cost $5,000,000.

District of Columbia

WASHINGTON — General purchasing officer, Panama canal, takes bids to 10:30 a.m., May 4, schedule 3349, for fencing material, pipe fittings, union pipe elbows, metal valves, cocks, twist drills, assorted files, rifflers' files, cold chisels, hacksaw blades, and portable electric welding machine, delivery Cristobal or Balboa, Isthmus of Panama, Canal zone.

WASHINGTON — Navy department, bureau of supplies and accounts, takes bids to 10 a.m., April 26, schedule 3316, for two motor-driven electric lathes, delivery Newport, R. I.; until 10 a.m., April 29, schedule 3306, for ball bearings, delivery Newport, R. I.; schedule 3308, for electric crane truck, delivery various east or west coast points; schedule 3335, for motor-driven centrifugal pumps, spare parts, tools and wrenches, delivery Brooklyn, N. Y.; schedule 3357, for motor-driven power presses, delivery Newport, R. I.

Kentucky

ASHLAND, KY. — City preparing application for WPA project covering improvements to waterworks. Cost $150,000.

FULTON, KY.—City plans electric distribution system.

LEACH STATION, KY.—Ashland Oil & Refining Co., Paul G. Blazer, Huntington, W. Va., will call for bids in about 4 weeks for constructing plant at Leach Station as part of expansion plans. Construction to start in two months. Cost $175,000.

LEXINGTON, KY.—Public service commission of Kentucky granted permission to Lexington Water Co. to make improvements and changes. Work includes constructing and installing facilities at main pumping station and purification plant, generators, pumps, steam turbines, filters and other equipment. Total cost $203,000.

MAYFIELD, KY. — West Kentucky Rural Electric Co-operative Corp. has been granted $100,000 by REA for power lines in Graves, Hickman and Calloway counties. This provides for 110 miles of 170 miles proposed.

SHELBYVILLE, KY.—City is asking engineers to submit bids on surveys and plans for sewage disposal plant complete with auxiliary equipment, piping, appurtenances and sanitary sewer system. H. G. Cleveland, clerk. Engineer not appointed.

VANCEBURG, KY.—City plans early call for bids on new municipal electric power plant. Bonds valued at $145,000 have been authorized. H. N. Herrmann, 3946 Ledgewood drive, Cincinnati, consulting engineer.

Florida

JACKSONVILLE, FLA.—City commission, F. M. Valz, chairman, receives bids April 13 for substation equipment, materials and construction, including changes and additions to switchgear, accessories and connections, outdoor power transformers, piping and accessories and air ejector equipment at Alleyrand avenue power station. O. Z. Tyler, superintendent of plants, Utilities building, foot of Laura street.

KENDALL, FLA. — Dade county commissioners, Edmund Friedman, county engineer, 13th floor, Courthouse building, Miami, receives bids April 5 for providing and erecting steel tower and water tank only, foundations to be provided by owners.

KEY WEST, FLA. — Florida aqueduct commission, William T. Doughtry, Key West, chairman, signed contract with L. L. Lee & Associates to make survey to estimate cost and feasibility of laying pipe line alongside road from Florida mainland to Key West to furnish adequate supply of fresh water. Survey to start at once. Estimated cost of pipe line and necessary pumping stations $3,000,000.

MIAMI, FLA.—Charles F. Miller, Protect-U-Awning Shutter Co., 233 Northwest Twenty-second street, receiving bids, no date set, for constructing manufacturing plant.

PENSACOLA, FLA.—City is considering constructing grain elevator on Frisco docks to be equipped with overhead conveyors, storage tanks and appurtenances.

Georgia

WEST POINT, GA.—City plans additions to present water system including elevated tank, booster pumps, repairs to present filter plant and renewing 6 and 8-inch mains. Have applied for $23,000 WPA funds. Totten & Loving, 3075 Peachtree road, northeast, Atlanta, Ga., engineers. (Noted in STEEL, Feb. 28, 1938).

Mississippi

CALHOUN CITY, MISS.—Kraft-Phenix Cheese Co., 400 North Rush street, Chicago, will establish cheese plant here, erect buildings.

JACKSON, MISS.—City will ask for bids soon for new municipal electric distributing system, including main transmission line for connecting with high tension system of TVA and three power substations with transformers, switchgear and auxiliary equipment. Estimated cost $135,000. Cost of entire project $660,000. Freeland Roberts & Co., Nashville, Tenn., consulting engineer.

LAUREL, MISS.—Southern Pine Electric Power association, S. D. Russell, president, Rose Hill community, has applied to REA for $1,462,000 for constructing approximately 1500 miles transmission lines in seven counties. Initial allocation of $225,000 has been received.

VICKSBURG, MISS.—Marquette Cement Mfg. Co., 140 South Dearborn street, Chicago, plans installing motors and controls, power drives, conveyors, loaders and other equipment in new bulk cement terminal plant at Vicksburg where site has been selected. Cost close to $250,000. Company engineering department in charge.

North Carolina

MORGANTON, N. C. — City votes May 10 on $200,000 water and electrical improvement bonds.

Tennessee

CLARKSVILLE, TENN.—City, W. D. Hudson, mayor, receives bids May 1 for constructing first unit of power system. Cost $85,000. City has WPA grant.

Louisiana

BREAUX BRIDGE, LA. — Breaux Bridge Sugar Co-operative Inc., S. Angelle, secretary, soon takes bids for powerhouse and electric power equipment. Cost $185,000. E. A. Rose, 816 Howard avenue, New Orleans, engineer. (Noted in STEEL, April 4, 1938).

NAPOLEONVILLE, LA.—Leo S. Weil and Walter B. Moses Inc., 425 South Peters street, New Orleans, are now drawing plans and specifications for new refinery for Supreme Sugar refinery. Cost approximately $600,000. Work includes steel mill buildings, sugar house machinery, generating units, new boilers. (Noted in STEEL, April 4, 1938).

West Virginia

ROMNEY, W. VA.—WPA approved loan of $62,304 for municipal sewage disposal plant. Blair M. Haynes, mayor.

Virginia

ROANOKE, VA.—City will acquire on May 1 plant of Roanoke Water Works Co. Will have available approximately $500,000 for improvements.

Missouri

DIXON, MO.—City will construct waterworks and sanitary sewer system. Cost $60,000. J. E. Peters, engineer.

Oklahoma

ENID, OKLA.—Enid citizens municipal gas committee, N. E. Grove, president, is considering purchasing or constructing city-owned gas distribution system. May vote on $700,000 bonds.

Wisconsin

CHIPPEWA FALLS, WIS.—W. S. Darley & Co., 2810 West Washington boulevard, Chicago, makers of gas and waterworks supplies, has let contract for constructing factory in this city at Woodward avenue and Walnut street.

GATLIFF, WIS.—Racine county soon lets contract for altering and constructing one-story addition to garage and warehouse, altering present building for boiler room. E. A. Klinger, Racine, architect.

MELROSE, WIS.—Bond issue for constructing municipal waterworks system was adopted at spring election. Project in charge of Frank J. Davy & Son, consulting engineers, 1611 Main street, La Crosse, Wis.

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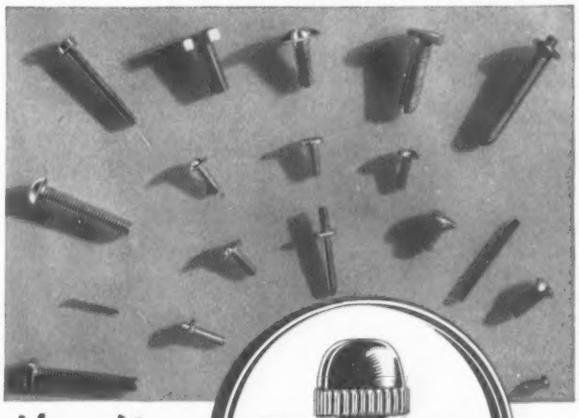

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TORRINGTON · · · CONNECTICUT

MILWAUKEE — Paramount Tool & Stamping Co. has been incorporated here by Frank C. Duchnowski, 2472 South Sixteenth street to engage in designing and manufacturing general tools, dies, jigs and fixtures.

SOUTH MILWAUKEE, WIS.—Line Material Co., manufacturer of transmission line fixtures and supplies, has taken over large factory in Zanesville, O., and will move its transformer department from South Milwaukee. W. D. Kyle, president.

Minnesota

HALLOCK, MINN.—Village, O. Myre, village clerk, is considering issuing bonds to finance constructing filtration and water softening plant. Cost about $45,000. E. L. Lium, 913 Almonte, Grand Forks, N. Dak., consulting engineer.

HIBBING, MINN.—Village, V. L. Cole, village clerk, will soon make application to WPA for aid in constructing sewage disposal plant. Cost $320,000. Burlingame, Hitchcock & Estabrook Inc., 521 Sexton building, Minneapolis, consulting engineer. (Noted in STEEL, March 28, 1938).

MADISON, MINN. — City, James H. Hayden, city clerk, is considering issuing $135,000 in bonds to finance purchasing additional power plant equipment, generator and water softener with 280,000 gallons capacity per day. Perkins & McWayne, 322 Paulton block, Sioux Falls, S. Dak., consulting engineers. (Noted in STEEL, March 21, 1938).

MORA, MINN. — Village, water and light commission, William Currie, secretary, is taking bids to 8 p.m., April 26, for oil engine generating unit and auxiliary work and equipment for municipal light and power plant. Burlingame, Hitchcock & Estabrook Inc., 521 Sexton building, Minneapolis, consulting engineer.

ROSEAU, MINN. — City, Herbert Monsrud, city clerk, has received report from consulting engineers, Lium & Burdick, Grand Forks, N. Dak., and will make application to WPA for aid in enlarging sewage disposal plant.

WORTHINGTON, MINN.—Nobles-Murray Electric Co-operative, Jay Seymour, secretary, has applied for additional funds to finance constructing 250 miles transmission lines to serve 760 customers. Banister Engineering Co., 1586 University avenue, St. Paul, consulting engineer.

Texas

BROWNSVILLE, TEX.—WPA approved $30,000 for repairs to city sewage lines and disposal plant.

HOUSTON, TEX.—Maritime Oil Co., 2009 Noble street, will erect refinery with 5000-barrel-per-day capacity, south side of ship channel.

SAN AUGUSTINE, TEX.—Deep East Texas Co-operative Electrification association, R. N. Stripling, chairman of the board, has allotment of $125,000 to provide for erecting 126 miles power lines covering Sabine, San Augustine and Shelby counties. Contracts to be let soon.

VAN ALSTYNE, TEX.—Grayson-Collin Electric Co-operative, Shirley G. Taylor, project superintendent, plans 175-mile extension to line in Tom Bean, Pink Hill and Farmington communities.

Kansas

QUENEMO, KANS.—City, John Logan, city clerk, has appointed Engineering Service Co., 113 Railway Exchange building, Kansas City, Mo., as consulting engineer, who is preparing preliminary plans for constructing waterworks system with deep wells, tank and tower, and new sewer system with disposal plant.

WATERVILLE, KANS. — Paulette & Wilson, 311 Farmers Union building, Salina, consulting engineers, are preparing preliminary report for the city on constructing rural electrification system and waterworks plant. A. F. Geyer, mayor.

Nebraska

BEATRICE, NEBR.—Southeastern Nebraska Public Power District, L. B. Rist, president, has filed application with Nebraska state railway commission for permission to construct 96 additional miles rural transmission lines in Gage county.

COLUMBUS, NEBR.—Loup River Public Power District, Harold Kramer, secretary, 2307 Thirteenth street, is taking bids to 10 a.m., April 26, for constructing a 40-mile 69-kilovolt three-phase suspension type transmission line between Columbus to a point near Norfolk, and a 7500-kilovolt-ampere step-down substation at Norfolk. Harza Engineering Co., 205 West Wacker drive, Chicago, Ill., consulting engineer.

HASTINGS, NEBR.—Central Nebraska Public Power & Irrigation District, R. O. Canaday, secretary, has filed application with the Nebraska state railway commission for permission to construct a 65-mile line, 34,500 volts, between Hastings and Holdrege, and a 13-mile 34,500-volt line between Hastings and Harvard, Nebr.

KEARNEY, NEBR.—State railway commission granted permission to Buffalo County Public Power District, Alvah G. Zimmerman, president to construct 141 miles transmission lines in Buffalo county. Robert Fulton, 2327 South Nineteenth street, Lincoln, consulting engineer.

MADISON, NEBR. — Nebraska state railway commission granted permission to Iowa-Nebraska Light & Power Co. to construct a 25-mile rural transmission line between Madison and Battle Creek, Nebr. Cost $17,500.

OMAHA, NEBR.—City plans new sewage disposal plant. Estimated cost between $400,000 and $800,000. Maturity late in summer. G. B. Gascoigne, Leader building, Cleveland, O., consulting engineer. W. Provaznik, city sewer engineer.

ORD, NEBR.—North Loup Electrical and Irrigation District, J. B. Barta, secretary, is taking bids to 10 a.m., May 4, for constructing pump house and installing one 2500-gallon-per-minute pump and motor and constructing complete lateral system for irrigation. Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineers.

SCOTTSBLUFF, NEBR. — Preliminary plans for constructing a power substation at Gering as part of an electrical transmission system linking Wyoming, Colorado and Nebraska were announced by C. F. Gleason, light and power superintendent, U. S. reclamation service, Guernsey, Wyo. Cost $100,000.

Iowa

HAMBURG, IOWA—City, E. L. Lair, city clerk, is taking bids to 2 p.m., May 16, for constructing water treatment plant, consisting of aeration, chemical softening and filtration equipment and accessories as per specifications on file with clerk. Currie Engineering Co., Webster City, Iowa, consulting engineer.

Montana

RICHEY, MONT.—City has applied for $15,000 WPA funds for proposed water system improvement including pipe, wells and pumping equipment.

Idaho

NAMPA, IDAHO—City plans bond election for constructing sewage disposal plant. Cost $180,000. WPA portion of cost is $56,000, city's, $125,000. L. R. Stockman, Baker, Oreg., engineer.

Pacific Coast

BAKERSFIELD, CALIF.—A certificate to conduct business under the firm name Town Pump & Engine Works, 2400 K street, Bakersfield, has been issued to L. E. Town.

LOS ANGELES—McClaran Oil Tool Inc. has been incorporated in Los Angeles county with a capital stock of $50,000. I. Q. Tobin, Los Angeles, E. C. McClaran and Nelson B. Cramer, Long Beach, Calif., and M. Humphries, Lomita, Calif., incorporators.

LOS ANGELES—Pacific Boiler & Engineering Co. has been incorporated with a capital stock of $15,000. The corporation is represented by Malot & Stafford, attorneys, 408 Board of Trade building, Los Angeles.

LOS ANGELES—A certificate to conduct business under the firm name Acme Screw Products Co., 5926 Regent street, Huntington Park, Calif., has been issued to the owners, N. Richard Johnson and Dale R. Porter.

LOS ANGELES—A certificate to conduct business under the firm name Cranehoist Conveyor Co., 2033 Santa Fe avenue, has been issued to the owner. Albert G. Schmidt, 6169 Springvale drive.

SACRAMENTO, CALIF.—County commission plans purchasing gas electric generator set for municipal camp.

SACRAMENTO, CALIF.—Western Pacific Railroad Mills building, San Francisco, J. Williams, chief engineer, soon lets contract for shop addition. Cost $200,000.

SAN BERNARDINO, CALIF.—A certificate to conduct business under the firm name Tri-State Fan & Blower Co., 414 Base Line, San Bernardino, has been issued to the owner, Edwin N. De Branch.

SHELTON, WASH.—Mason county has received WPA approval for $23,058 for aid in constructing proposed power line.

TACOMA, WASH.—Pacific Fruit & Produce Co. plans remodeling project at local plant, including installing latest type refrigerating equipment and machinery. Carl Anderson, engineer.

Canada

FAIRVILLE, N. B.—Wilson Boxes Ltd., Wall street, St. Johns, N. F., is preparing plans for box plant. Cost $75,000. Architect, care of owner.

ANDOVER, N. S.—Moore Canoe Co. Ltd., B. S. Moore, general manager, plans canoe and sporting goods equipment factory.

ELIAS, ONT.—Owner, care of H. K. Ferguson Co., 25 West Forty-third street, New York, architect, is completing plans for pulp mill. Cost $5,000,000.

KINGSTON, ONT.—Municipality is preparing plans for sewage disposal plant. Cost $75,000. C. C. Wyatt, clerk.

PORT CREDIT, ONT.—Owner, care of H. K. Ferguson Co., 25 West Forty-third street, New York, architect, is completing plans for paper pulp finishing plant. Cost $2,000,000.